

Expansion Joints Data  
for  
Pipe Stress Analysis programs

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## Axial Expansion Joints

### - with swivel lap-joint flanges

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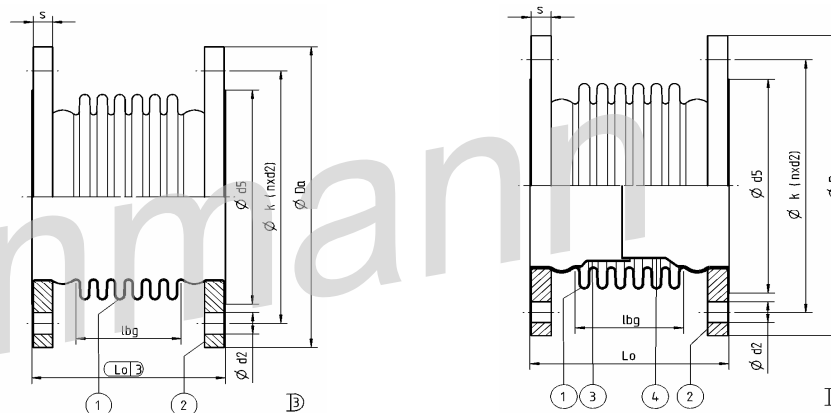
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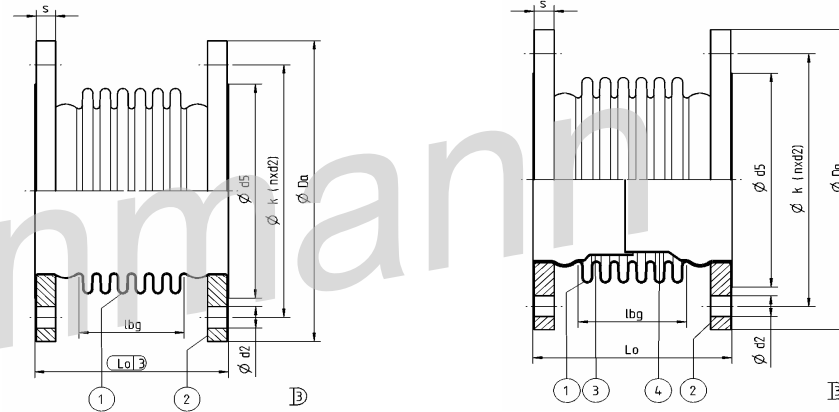
Type ABG 01...



Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles								
		ABG 01 ...		angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	axial	lateral	cT										
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm²	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
50	20	.0050.020.	103	2	2	6	90	10	0,9	89	45	46	30	3,9	0,3	105	1,3	451	420	1800	1,1
50	56	.0050.056.	184	2	3	6	90	10	0,9	89	126	46	50	31	1	37	0,5	20	150	230	0,4
50	80	.0050.080.	238	3	3	6	90	10	0,9	89	180	46	50	63	1	26	0,3	7	105	110	0,3
65	23	.0065.023.	103	3	3	6	107	10	1,1	107	45	68,7	28	3,7	0,3	102	1,9	654	350	1840	2,1
65	64	.0065.064.	184	3	3	6	107	10	1,1	107	126	68,7	50	29	1	36	0,7	30	125	235	0,7
65	92	.0065.092.	238	3	4	6	107	10	1,1	107	180	68,7	50	59	1	25	0,5	10	90	115	0,5
80	37	.0080.037.	127	4	4	6	122	10	1,6	121	70	89,1	39	8,1	0,5	67	1,7	233	220	840	2,1
80	69	.0080.069.	187	4	5	6	122	10	1,6	121	130	89,1	50	28	1	36	0,9	36	165	340	1,1
80	101	.0080.101.	247	4	5	6	122	10	1,6	121	190	89,1	50	60	1	25	0,6	12	80	115	0,8
100	40	.0100.040.	123	4	5	6	147	10	1,8	148	66	137	34	6,6	0,5	73	2,8	432	210	1050	4,4
100	79	.0100.079.	189	5	5	6	147	10	1,8	148	132	137	50	26	1	36	1,4	54	90	220	2,2
100	112	.0100.112.	244	5	6	6	147	10	1,8	148	187	137	50	53	1	26	1	19	60	110	1,6

# Axial expansion joints for low pressure with swivel lap-joint flanges

Type        **ABG 01...**

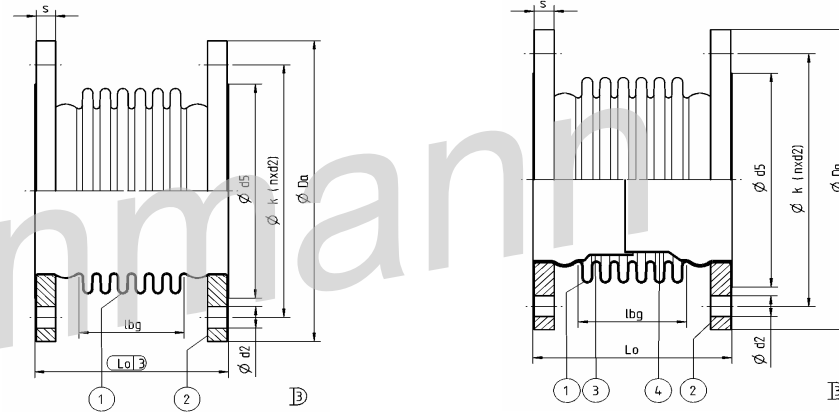


**PN 1**

Nominal diameter	Nominal axial movement absorption	Type  <b>ABG 01 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm²	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
125	63	.0125.063.	158	5	6	6	178	10	2,2	174	91	187	45	12	0,5	41	2,1	177	120	520	4,9
125	117	.0125.117.	236	6	7	6	178	10	2,2	174	169	187	50	43	1	22	1,1	28	70	150	2,6
125	180	.0125.180.	327	6	8	6	178	10	2,2	174	260	187	50	101	1	14	0,7	7,4	40	65	1,7
150	54	.0150.054.	145	6	6	6	202	10	2,4	203	78	264	33	7,7	0,7	56	4,1	465	140	830	10
150	126	.0150.126.	249	7	8	6	202	10	2,4	203	182	264	50	42	1	24	1,8	37	60	150	4,4
150	180	.0150.180.	327	7	9	6	202	10	2,4	203	260	264	50	85	1	17	1,2	13	40	75	3,1
200	70	.0200.070.	183	12	13	6	258	16	5,2	255	105	432	33	10	1	53	6,4	397	110	600	18
200	120	.0200.120.	258	13	14	6	258	16	5,2	255	180	432	50	31	1	31	3,7	79	60	210	11
200	200	.0200.200.	378	14	16	6	258	16	5,2	255	300	432	50	85	1	19	2,3	17	40	75	6,4
250	72	.0250.072.	190	14	16	6	312	16	6,2	312	102	661	28	8,4	0,7	62	11	752	110	780	39
250	132	.0250.132.	275	15	17	6	312	16	6,2	312	187	661	47	28	1	34	6,2	123	60	230	21
250	204	.0250.204.	377	17	20	6	312	16	6,2	312	289	661	50	68	1	22	4	33	40	100	14

# Axial expansion joints for low pressure with swivel lap-joint flanges

Type      **ABG 01...**

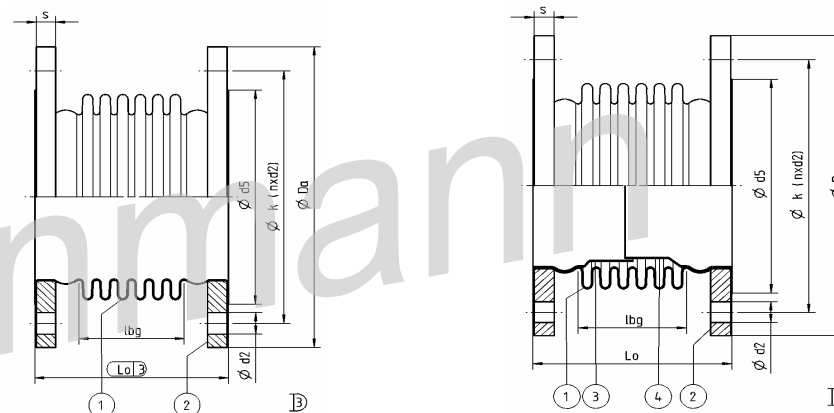


**PN 1**

Nominal diameter	Nominal axial movement absorption	Type  <b>ABG 01 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
300	56	.0300.056.	164	18	20	6	365	16	8,3	365	76	916	18	4,2	0,4	91	23	2756	140	1610	90
300	140	.0300.140.	278	20	22	6	365	16	8,3	365	190	916	43	26	1	36	9,2	174	60	260	36
300	210	.0300.210.	373	21	25	6	365	16	8,3	365	285	916	50	58	1	24	6,1	52	40	115	24
350	60	.0350.060.	168	23	25	6	410	16	10,7	400	80	1104	18	4,3	0,4	82	25	2703	120	1490	113
350	120	.0350.120.	248	24	27	6	410	16	10,7	400	160	1104	34	17	1	41	13	338	65	375	56
350	210	.0350.210.	368	26	30	6	410	16	10,7	400	280	1104	50	52	1	24	7,4	62	35	120	32
400	65	.0400.065.	203	28	30	6	465	16	11,7	458	105	1445	17	5,3	0,5	212	85	5283	120	1260	199
400	104	.0400.104.	266	30	33	6	465	16	11,7	458	168	1445	27	14	1	132	53	1291	80	500	124
400	195	.0400.195.	413	35	40	6	465	16	11,7	458	315	1445	45	48	1	71	29	195	40	140	66
450	56	.0450.056.	186	32	34	6	520	16	13,6	513	88	1825	13	3,4	0,3	243	123	10935	130	1850	333
450	112	.0450.112.	274	35	39	6	520	16	13,6	513	176	1825	26	14	1	122	62	1361	70	460	167
450	196	.0450.196.	406	40	46	6	520	16	13,6	513	308	1825	41	42	1	70	35	253	40	150	95

# Axial expansion joints for low pressure with swivel lap-joint flanges

Type      **ABG 01...**

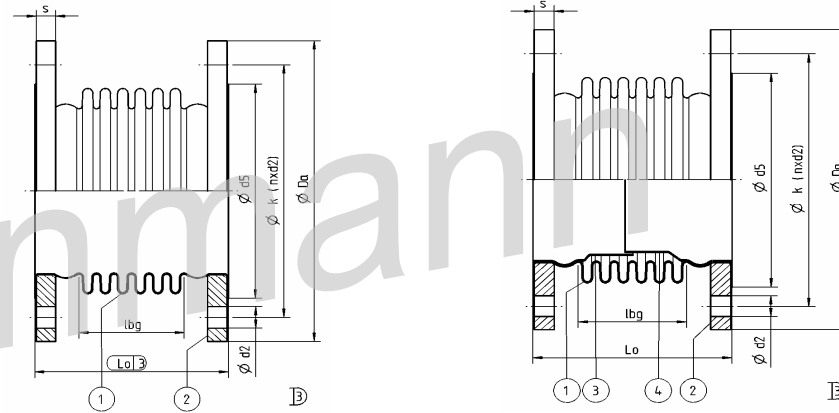


PN 1

Nominal diameter	Nominal axial movement absorption	Type  ABG 01 ...	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
500	68	.0500.068.	190	34	37	6	570	16	14,6	569	92	2252	14	3,9	0,3	215	135	10875	115	1690	427
500	119	.0500.119.	259	37	41	6	570	16	14,6	569	161	2252	24	12	1	123	77	2025	70	550	244
500	221	.0500.221.	397	43	50	6	570	16	14,6	569	299	2252	42	41	1	66	41	318	35	160	131
600	76	.0600.076.	210	52	56	6	670	20	22,7	674	104	3202	14	4,1	0,3	215	191	12099	100	1570	689
600	133	.0600.133.	288	56	61	6	670	20	22,7	674	182	3202	23	13	1	123	109	2252	60	510	394
600	228	.0600.228.	418	62	70	6	670	20	22,7	674	312	3202	36	37	1	72	64	446	35	175	230
700	80	.0700.080.	218	62	66	6	775	20	26,7	780	112	4324	12	4	0,3	203	244	13365	90	1480	1022
700	120	.0700.120.	274	65	71	6	775	20	26,7	780	168	4324	18	9,1	0,8	135	162	3950	60	660	681
700	220	.0700.220.	414	73	82	6	775	20	26,7	780	308	4324	30	30	1	74	89	644	30	195	372
800	84	.0800.084.	230	76	81	6	880	20	33,1	882	116	5588	11	3,9	0,3	220	341	17449	85	1570	1502
800	126	.0800.126.	288	79	87	6	880	20	33,1	882	174	5588	16	8,7	0,8	147	228	5182	60	700	1001
800	231	.0800.231.	433	89	100	6	880	20	33,1	882	319	5588	28	29	1	80	124	839	30	210	546

# Axial expansion joints for low pressure with swivel lap-joint flanges

Type      **ABG 01...**



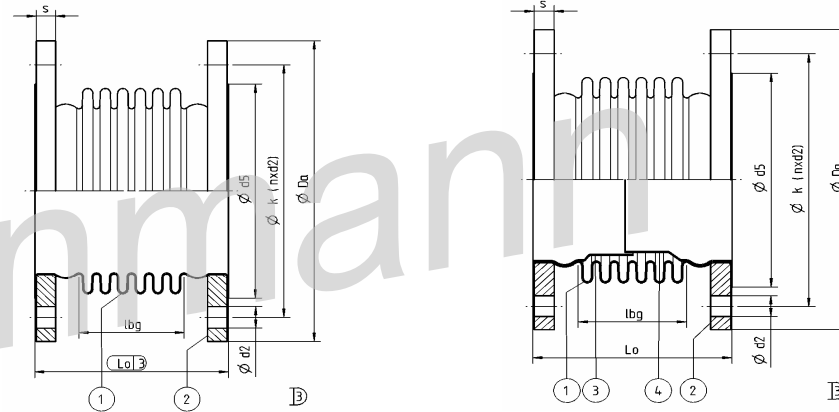
**PN 1**

Nominal diameter	Nominal axial movement absorption	Type  <b>ABG 01 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm²	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
900	84	.0900.084.	234	80	87	6	980	20	34,6	992	120	7133	9,9	3,5	0,2	238	472	22421	80	1650	2161
900	126	.0900.126.	294	84	93	6	980	20	34,6	992	180	7133	15	7,9	0,7	158	313	6643	60	730	1441
900	210	.0900.210.	414	93	105	6	980	20	34,6	992	300	7133	23	22	1	95	188	1438	30	260	865
1000	72	.1000.072.	220	84	91	6	1080	20	37,3	1095	96	8750	7,7	2,2	0,2	335	814	60745	105	2940	3869
1000	144	.1000.144.	316	92	101	6	1080	20	37,3	1095	192	8750	15	8,7	0,7	168	408	7570	50	740	1935
1000	240	.1000.240.	444	101	115	6	1080	20	37,3	1095	320	8750	23	24	1	101	245	1632	30	265	1161
1200	72	.1200.072.	225	104	121	2	1280	20	46	1295	93	12331	6,5	1,8	0,1	331	1134	89855	95	3210	6261
1200	120	.1200.120.	287	110	132	2	1280	20	46	1295	155	12331	11	4,9	0,4	198	678	19409	60	1160	3757
1200	216	.1200.216.	411	122	153	2	1280	20	46	1295	279	12331	18	16	1	110	377	3328	30	360	2087
1400	48	.1400.048.	136	125		2	1466	20	55,7	1456	104	16016	3,8	1,2	0,1	922	4053	257632	150	5320	10507
1400	108	.1400.108.	266	137		2	1466	20	55,7	1456	234	16016	8,4	5,9	0,5	410	1802	22624	70	1050	4670
1400	180	.1400.180.	422	151		2	1466	20	55,7	1456	390	16016	13	16	1	246	1081	4887	40	380	2802



# Axial expansion joints for low pressure with swivel lap-joint flanges

Type        **ABG 01...**

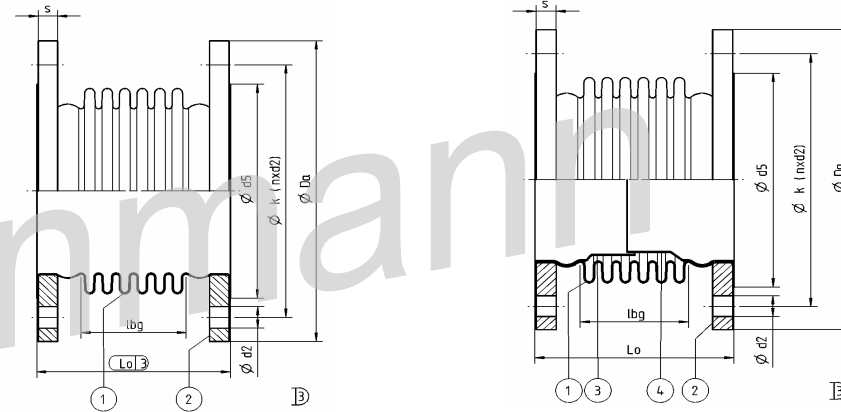


**PN 1**

Nominal diameter	Nominal axial movement absorption	Type  <b>ABG 01 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm²	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
1600	48	.1600.048.	136	155		2	1666	20	69,8	1656	104	20816	3,4	1	0,1	1046	5990	380429	150	6040	15684
1600	108	.1600.108.	266	169		2	1666	20	69,8	1656	234	20816	7,4	5,2	0,5	465	2660	33398	70	1200	6970
1600	180	.1600.180.	422	185		2	1666	20	69,8	1656	390	20816	12	14	1	279	1596	7214	40	430	4182
1800	48	.1800.048.	136	174		2	1866	20	78,1	1856	104	26245	3	0,9		1170	8449	536643	150	6760	22331
1800	108	.1800.108.	266	189		2	1866	20	78,1	1856	234	26245	6,6	4,6	0,4	520	3754	47143	70	1340	9925
1800	180	.1800.180.	422	208		2	1866	20	78,1	1856	390	26245	11	13	1	312	2253	10183	40	480	5955
2000	48	.2000.048.	136	192		2	2066	20	86,4	2056	104	32302	2,7	0,8		1292	11503	730650	150	7480	30632
2000	108	.2000.108.	266	209		2	2066	20	86,4	2056	234	32302	6	4,2	0,4	574	5114	64107	70	1480	13614
2000	180	.2000.180.	422	230		2	2066	20	86,4	2056	390	32302	9,6	12	1	345	3069	13872	40	530	8169
2200	48	.2200.048.	136	226		2	2266	20	102,3	2256	104	38987	2,5	0,7		1414	15205	965857	150	8200	40771
2200	108	.2200.108.	266	245		2	2266	20	102,3	2256	234	38987	5,4	3,8	0,3	628	6758	84718	70	1620	18121
2200	180	.2200.180.	422	267		2	2266	20	102,3	2256	390	38987	8,8	11	1	377	4050	18309	40	580	10872

# Axial expansion joints for low pressure with swivel lap-joint flanges

Type      **ABG 01...**



**PN 1**

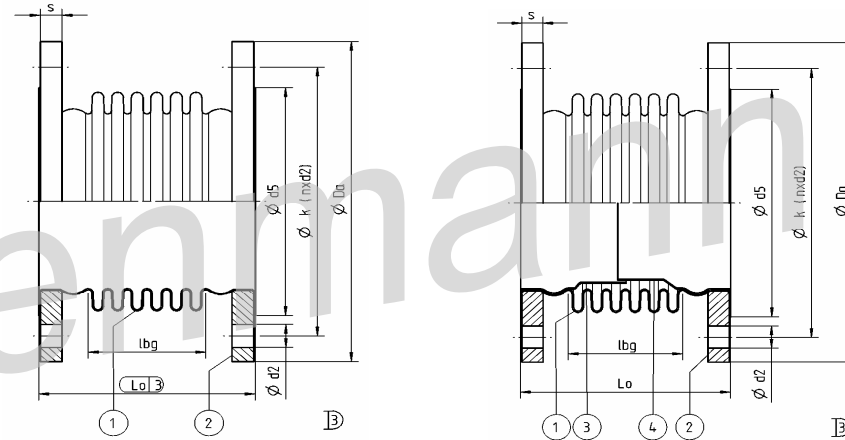
Nominal diameter	Nominal axial movement absorption	Type  <b>ABG 01 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
2400	48	.2400.048.	136	246		2	2466	20	111,3	2456	104	46301	2,3	0,7		1536	19613	1245968	150	8900	52932
2400	108	.2400.108.	266	266		2	2466	20	111,3	2456	234	46301	5	3,5	0,3	683	8720	109332	70	1760	23525
2400	180	.2400.180.	422	291		2	2466	20	111,3	2456	390	46301	8,1	9,6	1	410	5235	23604	40	630	14115
2600	48	.2600.048.	136	265		2	2666	20	120,2	2656	104	54243	2,1	0,6		1657	24816	1576541	150	9620	67298
2600	108	.2600.108.	266	288		2	2666	20	120,2	2656	234	54243	4,6	3,2	0,3	737	11029	138302	70	1900	29910
2600	180	.2600.180.	422	315		2	2666	20	120,2	2656	390	54243	7,5	8,9	0,8	442	6615	29900	40	680	17946
2800	48	.2800.048.	136	319		2	2866	20	146,1	2856	104	62813	1,9	0,6		1778	30848	1959837	150	10330	84054
2800	108	.2800.108.	266	343		2	2866	20	146,1	2856	234	62813	4,3	3	0,2	790	13714	171984	65	2040	37357
2800	180	.2800.180.	422	372		2	2866	20	146,1	2856	390	62813	7	8,3	0,8	474	8218	37149	40	740	22414
3000	48	.3000.048.	136	341		2	3066	20	156,2	3056	104	72011	1,8	0,5		1900	37786	2400702	150	11050	103383
3000	108	.3000.108.	266	367		2	3066	20	156,2	3056	234	72011	4	2,8	0,2	844	16803	210733	65	2180	45948
3000	180	.3000.180.	422	398		2	3066	20	156,2	3056	390	72011	6,5	7,7	0,7	507	10082	45573	40	790	27569

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 02...**

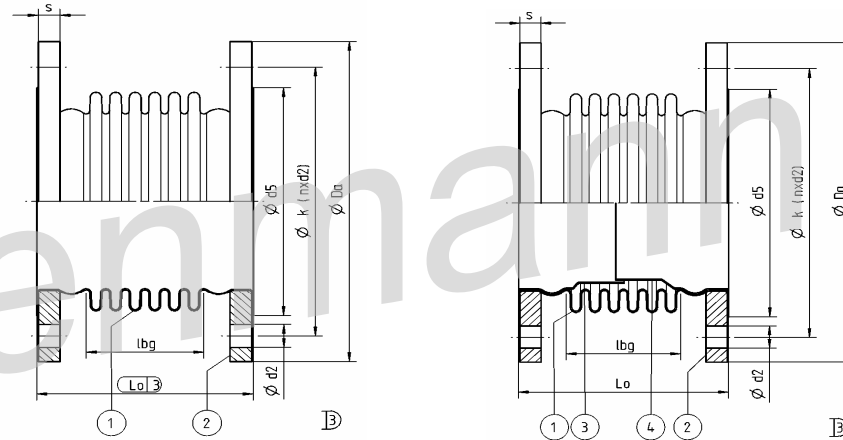


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  ABN 02 ...	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	20	.0050.020.	115	3	3	6	90	16	1,4	89	45	46	29	3,9	105	1,3	451	1,1
50	40	.0050.040.	160	3	3	6	90	16	1,4	89	90	46	50	16	52	0,7	56	0,6
50	70	.0050.070.	242	4	4	6	90	16	1,4	89	171	46	50	52	46	0,6	14	0,5
65	23	.0065.023.	115	4	4	6	107	16	1,8	107	45	68,7	28	3,7	102	1,9	654	2,1
65	60	.0065.060.	187	4	5	6	107	16	1,8	107	117	68,7	50	25	39	0,7	37	0,8
65	87	.0065.087.	261	5	6	6	107	16	1,8	108	190	69,4	50	59	40	0,8	14	0,8
80	27	.0080.027.	123	6	6	6	122	18	2,8	121	50	89,1	28	4,1	94	2,3	640	2,9
80	64	.0080.064.	193	6	7	6	122	18	2,8	121	120	89,1	50	24	39	1	46	1,2
80	92	.0080.092.	272	7	8	6	122	18	2,8	121	198	89,1	50	57	43	1,1	18	1,2
100	46	.0100.046.	150	7	8	6	147	18	3,2	148	77	137	38	9	63	2,4	273	3,8
100	73	.0100.073.	194	7	8	6	147	18	3,2	148	121	137	50	22	40	1,5	71	2,4
100	98	.0100.098.	283	10	11	6	147	18	3,1	150	208	139	50	51	71	2,7	43	4

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 02...**

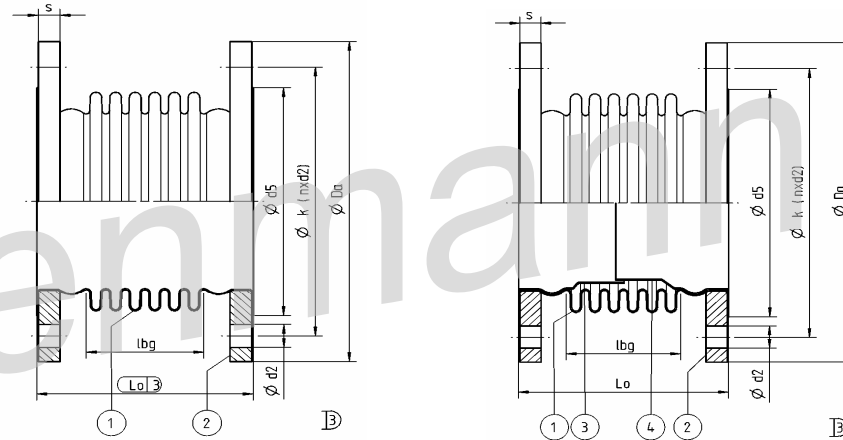


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  <b>ABN 02 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
125	45	.0125.045.	152	9	10	6	178	20	4,4	174	65	187	32	6,3	58	3	492	6,9
125	81	.0125.081.	204	10	11	6	178	20	4,4	174	117	187	50	20	32	1,7	84	3,8
125	140	.0125.140.	369	13	15	6	178	20	4,3	172	280	185	50	85	53	2,7	23	4,6
150	45	.0150.045.	152	10	11	6	202	20	4,8	203	65	264	27	5,3	68	5	801	12
150	81	.0150.081.	204	11	12	6	202	20	4,8	203	117	264	46	17	38	2,8	137	6,9
150	160	.0150.160.	389	16	18	6	202	20	4,8	203	300	264	50	87	51	3,7	29	7,8
200	60	.0200.060.	180	15	16	6	258	22	6,9	255	90	432	28	7,7	62	7,4	631	21
200	110	.0200.110.	267	17	19	6	258	22	6,9	256	176	434	47	27	50	6	134	17
200	190	.0200.190.	415	22	25	6	258	22	6,9	257	323	436	50	87	51	6,2	41	16
250	72	.0250.072.	206	20	21	6	312	24	9	312	102	661	27	8,4	62	11	752	39
250	120	.0250.120.	275	22	24	6	312	24	9	315	170	667	42	23	48	8,9	212	33
250	204	.0250.204.	412	29	32	6	312	24	9	316	306	670	50	71	50	9,3	67	32

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 02...**

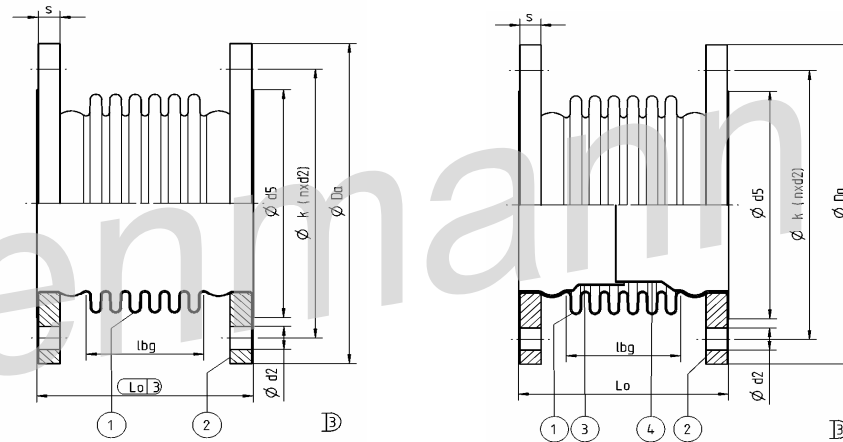


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  <b>ABN 02 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsions- steifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
300	56	.0300.056.	180	26	28	6	365	24	12,2	365	76	916	18	4,2	91	23	2756	90
300	126	.0300.126.	275	27	30	6	365	24	12,2	365	171	916	36	21	40	10	239	40
300	210	.0300.210.	386	36	40	6	365	24	12,2	371	280	932	50	57	52	13	118	59
350	60	.0350.060.	188	36	38	6	410	26	17,1	400	80	1104	18	4,3	82	25	2703	113
350	120	.0350.120.	269	39	42	6	410	26	17,1	402	160	1110	33	17	58	18	480	83
350	210	.0350.210.	404	47	51	6	410	26	17,1	402	294	1110	50	55	60	19	147	79
400	65	.0400.065.	227	45	48	6	465	28	20,4	458	105	1445	17	5,3	212	85	5283	199
400	104	.0400.104.	290	47	51	6	465	28	20,4	458	168	1445	26	14	132	53	1291	124
400	182	.0400.182.	416	52	57	6	465	28	20,4	458	294	1445	38	42	76	31	240	71
450	56	.0450.056.	210	51	53	6	520	28	23,3	513	88	1825	13	3,4	243	123	10935	333
450	112	.0450.112.	298	55	59	6	520	28	23,3	513	176	1825	24	14	122	62	1361	167
450	182	.0450.182.	408	59	64	6	520	28	23,3	513	286	1825	34	36	75	38	320	103

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 02...**

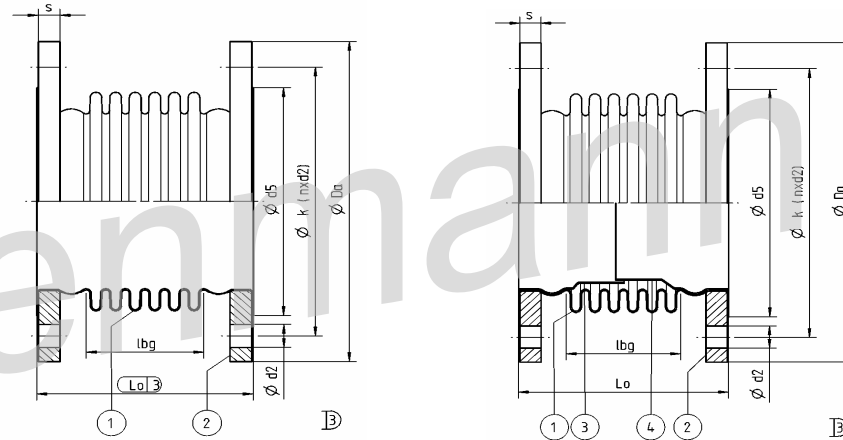


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsionssteifigkeit
		ABN 02 ...		without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
500	68	.0500.068.	214	56	59	6	570	28	25,1	569	92	2252	14	3,9	215	135	10875	427
500	119	.0500.119.	283	59	63	6	570	28	25,1	569	161	2252	24	12	123	77	2025	244
500	204	.0500.204.	398	64	70	6	570	28	25,1	569	276	2252	35	35	72	45	401	142
600	76	.0600.076.	234	78	82	6	670	32	35,4	674	104	3202	13	4,1	215	191	12099	689
600	114	.0600.114.	286	80	85	6	670	32	35,4	674	156	3202	19	9,3	143	127	3593	460
600	209	.0600.209.	416	87	94	6	670	32	35,4	674	286	3202	30	31	78	69	583	251
700	80	.0700.080.	242	94	99	6	775	32	42,7	780	112	4324	12	4	203	244	13365	1022
700	120	.0700.120.	298	97	104	6	775	32	42,7	780	168	4324	17	9,1	135	162	3950	681
700	220	.0700.220.	438	105	115	6	775	32	42,7	780	308	4324	27	30	74	89	644	372
800	63	.0800.063.	229	121	124	6	880	34	56,2	882	87	5588	8,4	2,2	294	456	41313	2003
800	126	.0800.126.	316	126	134	6	880	34	56,2	882	174	5588	16	8,7	147	228	5182	1001
800	210	.0800.210.	432	134	144	6	880	34	56,2	882	290	5588	23	24	88	137	1117	601

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 02...**



**PN 2,5**

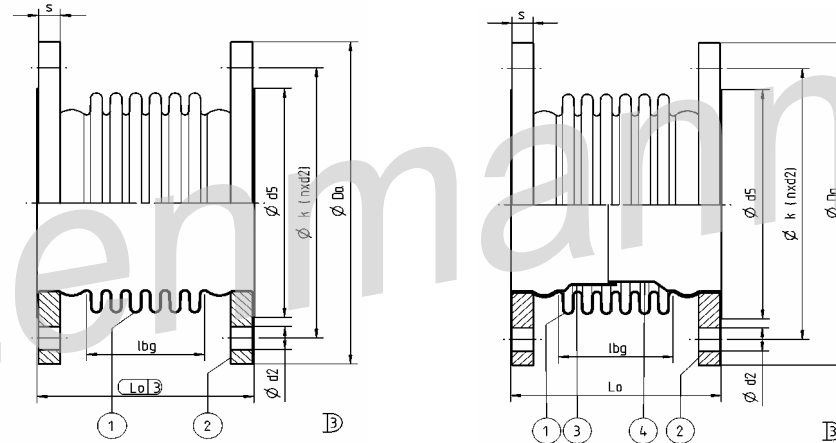
Nominal diameter	Nominal axial movement absorption	Type  <b>ABN 02 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
900	63	.0900.063.	234	130	135	6	980	35	60,5	992	90	7133	7,4	2	317	628	53147	2882
900	126	.0900.126.	324	137	146	6	980	35	60,5	992	180	7133	14	7,9	158	313	6643	1441
900	210	.0900.210.	444	146	158	6	980	35	60,5	992	300	7133	21	22	95	188	1438	865
1000	72	.1000.072.	254	149	154	6	1080	37	69,1	1095	96	8750	7,7	2,2	335	814	60745	3869
1000	120	.1000.120.	318	154	163	6	1080	37	69,1	1095	160	8750	12	6,1	201	489	13121	2322
1000	240	.1000.240.	478	166	181	6	1080	37	69,1	1095	320	8750	21	24	101	245	1632	1161
1200	72	.1200.072.	269	204	217	2	1280	40	92,1	1295	96	12331	6,5	1,8	511	1750	130579	9432
1200	120	.1200.120.	333	213	238	2	1280	40	92,1	1295	160	12331	11	5,1	307	1052	28150	5659
1200	216	.1200.216.	461	231	266	2	1280	40	92,1	1295	288	12331	18	17	170	582	4827	3144

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 06...**



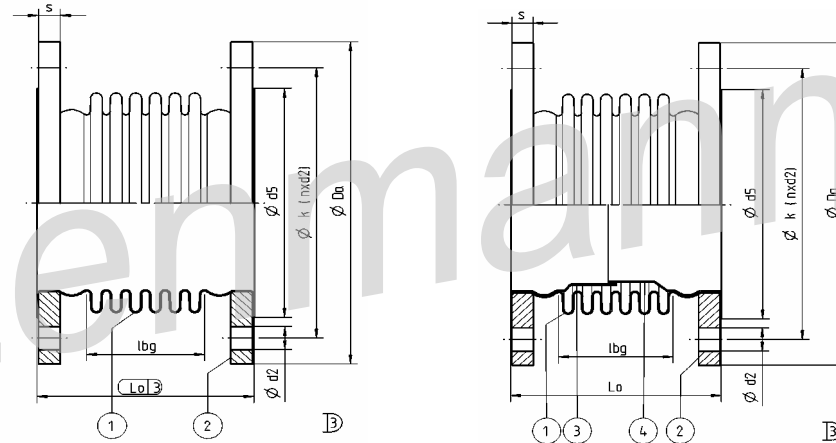
### PN 6

Nominal diameter	Nominal axial movement absorption	Type <b>ABN 06 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	20	.0050.020.	115	3	3	6	90	16	1,4	89	45	46	28	3,9	105	1,3	451	1,1
50	52	.0050.052.	197	4	4	6	90	16	1,4	89	126	46	50	28	62	0,8	34	0,6
65	23	.0065.023.	115	4	4	6	107	16	1,8	107	45	68,7	27	3,7	102	1,9	654	2,1
65	41	.0065.041.	151	4	5	6	107	16	1,8	107	81	68,7	42	12	56	1,1	112	1,2
65	72	.0065.072.	270	6	7	6	107	16	1,7	110	198	70,9	50	50	91	1,8	30	1,7
80	27	.0080.027.	123	6	6	6	122	18	2,8	121	50	89,1	27	4,1	94	2,3	640	2,9
80	42	.0080.042.	153	6	7	6	122	18	2,8	121	80	89,1	38	11	59	1,5	154	1,8
80	77	.0080.077.	280	9	9	6	122	18	2,8	123	204	90,8	50	48	97	2,4	40	2,5
100	33	.0100.033.	128	7	7	6	147	18	3,2	148	55	137	27	4,6	88	3,3	752	5,3
100	59	.0100.059.	182	8	8	6	147	18	3,2	149	108	138	43	16	71	2,7	160	4,3
100	87	.0100.087.	271	10	11	6	147	18	3,1	151	195	140	50	42	91	3,5	63	5,1



## Axial expansion joints with swivel lap-joint flanges

Type **ABN 06...**

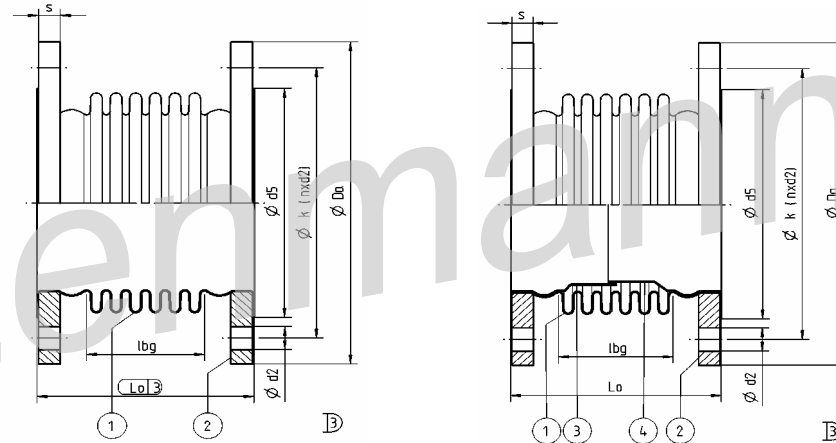


### PN 6

Nominal diameter	Nominal axial movement absorption	Type <b>ABN 06 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
125	36	.0125.036.	139	9	10	6	178	20	4,4	174	52	187	25	4	72	3,7	953	8,6
125	63	.0125.063.	178	10	10	6	178	20	4,4	174	91	187	39	12	41	2,1	177	4,9
125	98	.0125.098.	300	13	14	6	178	20	4,3	173	210	186	50	45	89	4,6	71	7,8
150	40	.0150.040.	158	11	11	6	202	20	4,8	202	70	263	23	5,1	117	8,5	1189	19
150	72	.0150.072.	224	13	14	6	202	20	4,8	203	135	264	39	18	114	8,4	313	17
150	124	.0150.124.	363	18	20	6	202	20	4,6	205	272	267	50	61	104	7,7	70	14
200	40	.0200.040.	155	15	16	6	258	22	6,9	256	64	434	19	3,6	138	17	2791	47
200	80	.0200.080.	228	18	19	6	258	22	6,9	257	136	436	34	15	121	15	540	39
200	140	.0200.140.	346	24	26	6	258	22	6,7	260	252	441	50	50	110	13	145	34
250	48	.0250.048.	178	21	22	6	312	24	9	316	72	670	18	3,9	211	39	5156	138
250	84	.0250.084.	232	23	25	6	312	24	9	316	126	670	29	12	120	22	967	79
250	144	.0250.144.	348	30	33	6	312	24	8,8	319	240	677	45	39	110	21	245	70

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 06...**

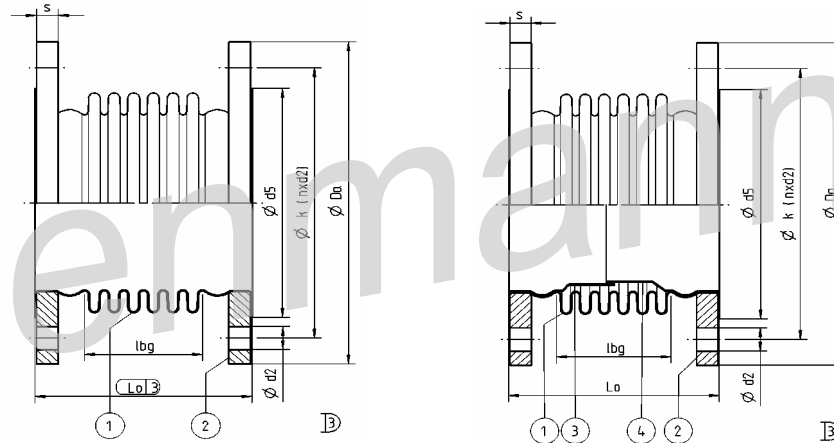


### PN 6

Nominal diameter	Nominal axial movement absorption	Type <b>ABN 06 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
300	60	.0300.060.	186	28	30	6	365	24	12,2	371	80	932	19	4,6	183	47	5062	207
300	90	.0300.090.	226	30	32	6	365	24	12,2	371	120	932	27	10	122	32	1496	138
300	135	.0300.135.	306	37	40	6	365	24	11,9	374	198	940	39	26	128	33	582	142
350	45	.0350.045.	173	38	39	6	410	26	17,1	402	63	1110	13	2,5	282	87	15014	371
350	105	.0350.105.	257	41	44	6	410	26	17,1	402	147	1110	28	14	121	37	1178	159
350	165	.0350.165.	365	50	54	6	410	26	16,7	405	253	1119	40	37	120	37	397	156
400	52	.0400.052.	211	47	49	6	465	28	20,4	461	88	1456	13	3,5	361	146	12887	359
400	104	.0400.104.	299	51	55	6	465	28	20,4	461	176	1456	23	14	180	73	1606	179
400	169	.0400.169.	423	61	66	6	465	28	20,1	462	299	1459	32	39	148	60	461	146
450	56	.0450.056.	215	54	56	6	520	28	23,3	514	92	1828	13	3,6	366	186	15018	496
450	98	.0450.098.	284	57	61	6	520	28	23,3	514	161	1828	20	11	209	106	2802	283
450	182	.0450.182.	436	71	77	6	520	28	23,3	515	312	1832	30	39	150	76	539	202

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 06...**

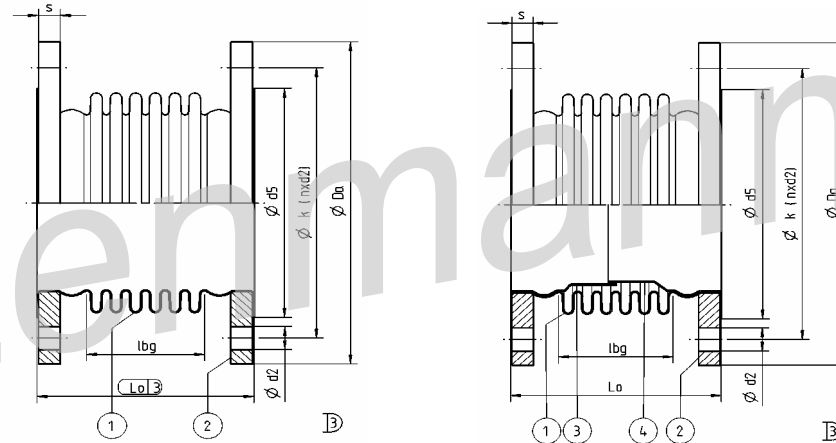


### PN 6

Nominal diameter	Nominal axial movement absorption	Type <b>ABN 06 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thickness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
500	66	.0500.066.	224	61	65	6	570	28	25,1	572	100	2265	14	4,1	414	260	17778	831
500	116	.0500.116.	299	67	72	6	570	28	25,1	572	175	2265	22	13	236	148	3319	475
500	198	.0500.198.	450	90	97	6	570	28	24,5	574	324	2273	33	40	208	131	856	410
600	76	.0600.076.	244	85	89	6	670	32	35,4	677	112	3217	13	4,4	414	370	20180	1344
600	114	.0600.114.	300	90	96	6	670	32	35,4	677	168	3217	19	10	276	247	5986	896
600	198	.0600.198.	453	118	127	6	670	32	34,7	678	319	3222	29	33	236	211	1421	737
700	60	.0700.060.	224	108	111	6	775	36	46,8	780	84	4324	9,1	2,3	585	703	68235	2788
700	120	.0700.120.	308	117	124	6	775	36	46,8	780	168	4324	17	9,1	293	352	8544	1394
700	200	.0700.200.	442	147	156	6	775	36	45,8	783	300	4342	25	27	255	308	2331	1225
800	63	.0800.063.	251	143	147	6	880	37	58,5	887	99	5621	8,4	2,5	856	1337	93326	5800
800	105	.0800.105.	317	154	162	6	880	37	58,5	887	165	5621	14	6,8	514	803	20150	3480
800	210	.0800.210.	482	183	195	6	880	37	58,5	887	330	5621	23	27	257	401	2524	1740

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 06...**



**PN 6**

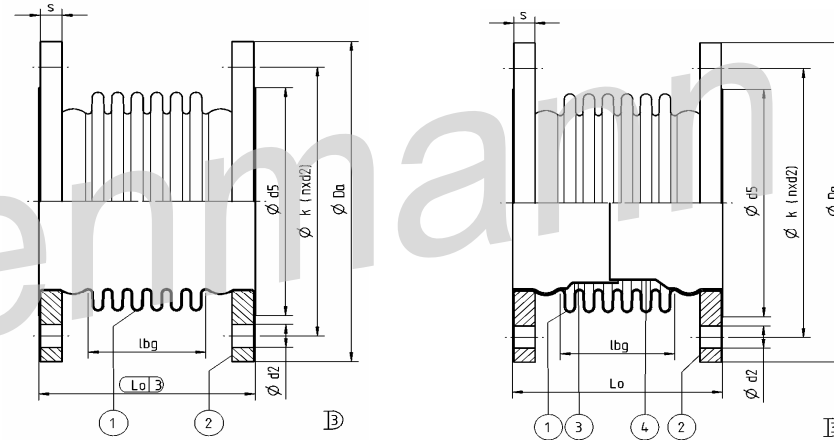
Nominal diameter	Nominal axial movement absorption	Type <b>ABN 06 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thickness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
900	63	.0900.063.	253	156	161	6	980	38	63,5	996	99	7163	7,4	2,2	953	1896	132463	8489
900	105	.0900.105.	319	169	178	6	980	38	63,5	996	165	7163	12	6	572	1138	28592	5093
900	210	.0900.210.	484	202	216	6	980	38	63,5	996	330	7163	20	24	286	569	3580	2547
1000	66	.1000.066.	277	184	190	6	1080	42	75,7	1100	105	8791	7	2,2	974	2379	147726	11286
1000	110	.1000.110.	347	199	209	6	1080	42	75,7	1100	175	8791	11	6,1	584	1426	31909	6772
1000	198	.1000.198.	487	229	244	6	1080	42	75,7	1100	315	8791	18	20	325	794	5466	3762
1200	69	.1200.069.	295	296	311	6	1290	47	127,1	1296	105	12341	6,2	1,9	1092	3743	232590	18919
1200	115	.1200.115.	365	314	340	6	1290	47	127,1	1296	175	12341	10	5,4	655	2245	50255	11351
1200	207	.1200.207.	505	350	388	6	1290	47	127,1	1296	315	12341	16	17	364	1248	8622	6306

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 10...**

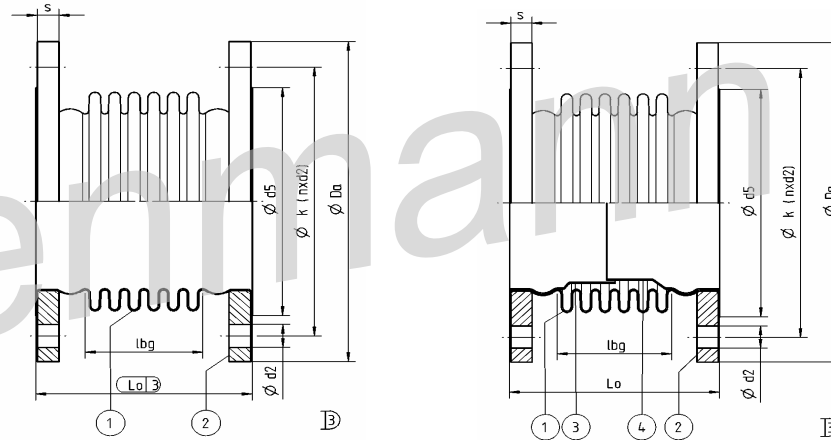


### PN 10

Nominal diameter	Nominal axial movement absorption	Type  ABN 10 ...	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraftrate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	24	.0050.024.	130	5	5	16	92	19	2,5	89	54	46	31	5,6	87	1,1	259	1
50	46	.0050.046.	218	6	7	16	92	19	2,4	90	140	46,6	50	28	115	1,5	51	1
65	18	.0065.018.	114	6	7	16	107	20	3	107	36	68,7	21	2,4	127	2,4	1275	2,6
65	48	.0065.048.	212	8	9	16	107	20	3	110	132	70,9	47	22	136	2,7	103	2,5
80	20	.0080.020.	122	8	8	16	122	20	3,5	121	44	89,1	21	2,8	192	4,8	1670	5,5
80	41	.0080.041.	166	8	8	16	1	20	3,5	121	88	89,1	36	11	96	2,4	209	2,8
80	54	.0080.054.	224	9	10	16	2,7	20	3,4	123	144	90,8	45	24	137	3,5	113	3,6
100	26	.0100.026.	130	9	10	16	1	22	4,2	149	48	138	22	3,2	161	6,2	1817	9,7
100	46	.0100.046.	166	10	10	16	1,3	22	4,2	149	84	138	33	9,8	92	3,5	340	5,6
100	80	.0100.080.	295	14	15	16	5,7	22	4,1	152	210	141	48	42	131	5,1	78	6,7
125	30	.0125.030.	148	12	12	16	0,9	22	5,5	171	56	184	21	3,7	148	7,6	1646	14
125	45	.0125.045.	176	12	13	16	1,2	22	5,5	171	84	184	29	8,2	99	5,1	488	9,2
125	85	.0125.085.	303	16	17	16	5,8	22	5,3	174	208	187	46	38	138	7,2	113	11

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 10...**

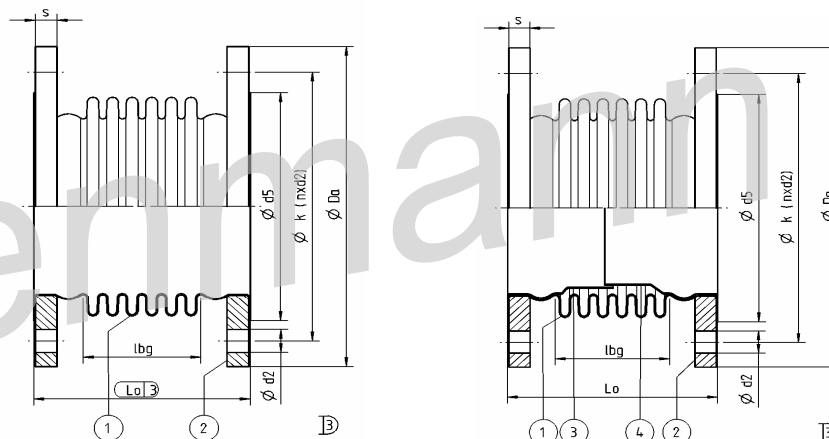


**PN 10**

Nominal diameter	Nominal axial movement absorption	Type  ABN 10 ...	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsions- steifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
150	32	.0150.032.	157	16	17	16	2	24	7,2	203	60	264	19	3,5	257	19	3564	39
150	64	.0150.064.	217	17	18	16	3,1	24	7,2	203	120	264	33	14	128	9,4	445	20
150	95	.0150.095.	307	21	22	16	7,4	24	7	205	208	267	43	36	136	10	157	19
200	40	.0200.040.	164	21	22	10	2,7	24	9,3	257	68	436	19	3,8	242	29	4318	78
200	80	.0200.080.	232	23	24	10	4,4	24	9,3	257	136	436	31	15	121	15	540	39
200	110	.0200.110.	296	27	29	10	9,3	24	9,1	260	198	441	41	31	140	17	297	44
250	48	.0250.048.	182	27	28	10	3,9	26	12	316	72	670	18	3,9	211	39	5156	138
250	84	.0250.084.	236	29	31	10	5,6	26	12	316	126	670	27	12	120	22	967	79
250	130	.0250.130.	416	41	44	10	18,4	26	11,7	319	304	677	32	45	201	38	278	56
300	45	.0300.045.	174	32	33	10	5	26	13,7	372	63	935	15	2,7	292	76	13045	326
300	90	.0300.090.	237	34	37	10	7,7	26	13,7	372	126	935	26	11	146	38	1631	163
300	137	.0300.137.	443	52	56	10	26,6	26	13,4	374	330	940	31	44	240	63	391	108

# Axial expansion joints with swivel lap-joint flanges

Type **ABN 10...**

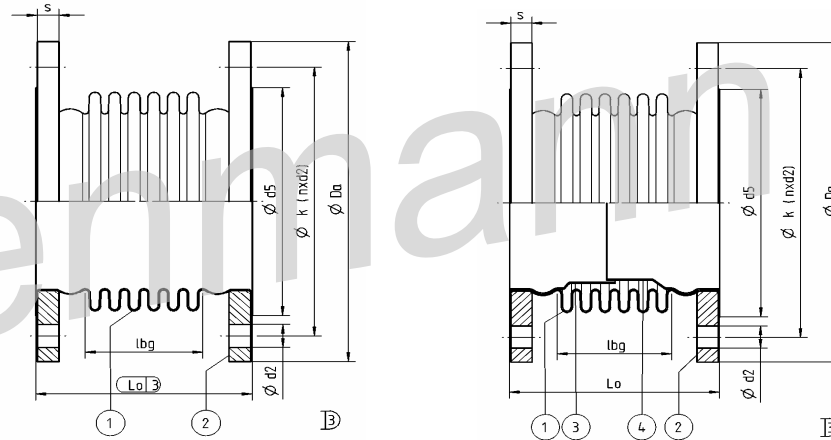


**PN 10**

Nominal diameter	Nominal axial movement absorption	Type  ABN 10 ...	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsions- steifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
350	60	.0350.060.	203	46	49	10	6,6	28	20,4	403	88	1113	17	4,7	251	78	6864	328
350	105	.0350.105.	269	49	52	10	9,6	28	20,4	403	154	1113	26	14	144	45	1282	188
350	150	.0350.150.	479	79	84	10	42,1	28	19,6	412	360	1140	32	47	289	92	479	178
400	48	.0400.048.	230	67	69	10	14,5	32	27,4	464	96	1466	12	3,6	730	297	21961	706
400	96	.0400.096.	326	76	80	10	23,3	32	27,4	464	192	1466	22	14	365	149	2749	353
400	156	.0400.156.	474	97	103	10	46,5	32	26,7	467	338	1476	31	41	291	119	708	281
450	70	.0450.070.	259	77	80	10	19,6	32	29,7	518	125	1844	16	6	564	289	12620	771
450	98	.0450.098.	309	82	86	10	24,8	32	29,7	518	175	1844	21	12	403	206	4599	551
450	182	.0450.182.	459	97	104	10	40,3	32	29,7	518	325	1844	29	41	217	111	717	297
500	66	.0500.066.	246	89	92	10	19,9	34	35,9	574	108	2273	14	4,4	625	395	23078	1229
500	116	.0500.116.	327	98	103	10	29,1	34	35,9	574	189	2273	22	14	357	225	4303	702
500	192	.0500.192.	476	126	134	10	60,2	34	35	576	336	2282	30	40	282	179	1077	542

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 10...**



**PN 10**

Nominal diameter	Nominal axial movement absorption	Type <b>ABN 10 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
600	72	.0600.072.	258	115	119	10	24,6	36	46,5	678	116	3222	12	4,3	649	581	29497	2027
600	108	.0600.108.	316	122	128	10	32,5	36	46,5	678	174	3222	17	9,8	433	388	8740	1351
600	198	.0600.198.	474	158	167	10	70,4	36	46	680	330	3232	27	34	318	286	1791	976
700	57	.0700.057.	248	158	161	10	34,5	40	64	785	96	4353	8,6	2,4	1142	1381	102304	5375
700	114	.0700.114.	344	177	185	10	54,2	40	64	785	192	4353	16	9,8	571	690	12788	2687
700	190	.0700.190.	472	204	214	10	80,5	40	64	785	320	4353	23	27	343	415	2761	1612

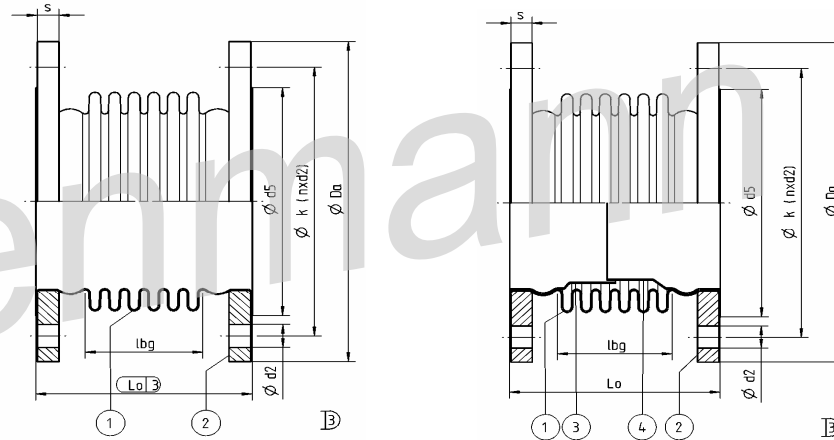
1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.



## Axial expansion joints with swivel lap-joint flanges

Type **ABN 16...**

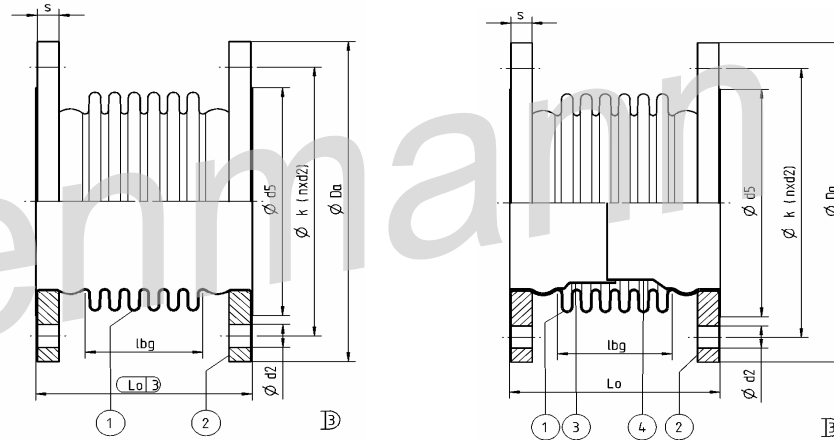


### PN 16

Nominal diameter	Nominal axial movement absorption	Type <b>ABN 16 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraft rate			Torsions- steifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	22	.0050.022.	131	6	6	16	92	19	2,5	89	54	46	29	5,2	146	1,9	430	1,5
50	42	.0050.042.	221	6	7	16	92	19	2,4	91	143	47,2	42	26	153	2	66	1,3
65	28	.0065.028.	139	7	7	16	107	20	3	108	60	69,4	29	5,9	126	2,4	457	2,5
65	48	.0065.048.	212	8	9	16	107	20	3	110	132	70,9	40	22	136	2,7	103	2,5
80	23	.0080.023.	139	8	8	16	122	20	3,5	122	60	89,9	23	4,3	278	6,9	1302	7,3
80	50	.0080.050.	212	9	10	16	122	20	3,4	123	132	90,8	38	20	150	3,8	146	3,9
100	31	.0100.031.	148	10	10	16	147	22	4,2	150	65	139	24	5	227	8,8	1400	13
100	53	.0100.053.	225	12	13	16	147	22	4,1	152	140	141	36	18	196	7,7	264	10
125	21	.0125.021.	135	12	13	16	178	22	5,5	172	42	185	15	1,9	350	18	6932	31
125	42	.0125.042.	177	13	13	16	178	22	5,5	172	84	185	27	7,7	175	9	867	15
125	59	.0125.059.	239	15	15	16	178	22	5,3	174	144	187	34	18	200	10	338	16

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 16...**

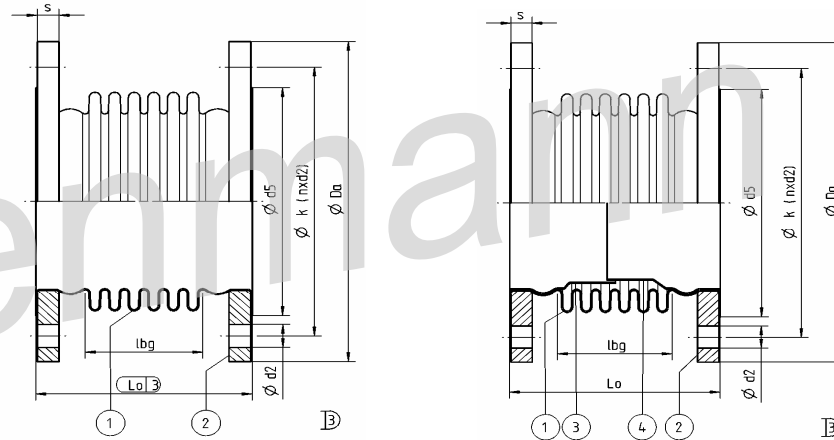


### PN 16

Nominal diameter	Nominal axial movement absorption	Type <b>ABN 16 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
150	24	.0150.024.	142	16	16	16	208	24	7,2	203	45	264	14	2	342	25	8455	52
150	48	.0150.048.	187	17	18	16	208	24	7,2	203	90	264	25	7,8	171	13	1054	26
150	66	.0150.066.	243	19	20	16	208	24	7	205	144	267	32	17	196	15	475	27
200	30	.0200.030.	156	22	23	16	258	26	9,6	260	54	441	14	2,3	514	63	14678	161
200	60	.0200.060.	210	24	26	16	258	26	9,6	260	108	441	26	9,1	257	31	1835	80
200	97	.0200.097.	373	33	35	16	258	26	9,4	262	270	445	29	37	276	34	316	40
250	32	.0250.032.	193	33	34	16	320	29	14,2	318	76	674	12	2,8	640	120	14135	179
250	56	.0250.056.	250	35	37	16	320	29	14,2	318	133	674	18	8,5	366	69	2635	102
250	103	.0250.103.	379	45	48	16	320	29	13,9	320	260	679	27	30	300	57	568	82
300	30	.0300.030.	187	44	45	16	375	32	18,9	374	63	940	9,6	1,8	940	246	42077	449
300	80	.0300.080.	292	50	53	16	375	32	18,9	374	168	940	21	13	352	92	2220	168
300	120	.0300.120.	472	71	75	16	375	32	18,3	376	345	946	25	40	327	86	489	143

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 16...**



### PN 16

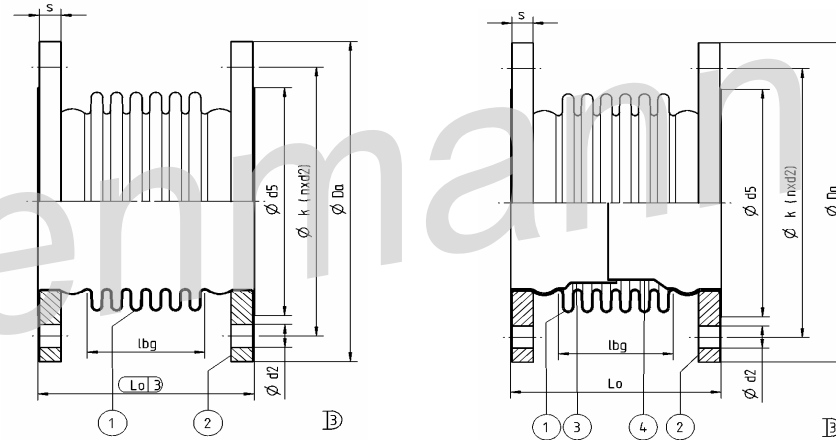
Nominal diameter	Nominal axial movement absorption	Type <b>ABN 16 ...</b>	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
350	30	.0350.030.	187	58	59	16	410	32	25,5	408	63	1128	8,8	1,7	920	288	49455	580
350	80	.0350.080.	292	65	68	16	410	32	25,5	408	168	1128	19	12	345	108	2611	217
350	130	.0350.130.	439	85	89	16	410	32	24,8	412	312	1140	26	35	334	106	736	205
400	48	.0400.048.	244	79	81	16	465	34	31,2	467	104	1476	12	3,8	946	388	24342	914
400	84	.0400.084.	322	88	92	16	465	34	31,2	467	182	1476	19	12	541	222	4544	522
400	132	.0400.132.	426	100	105	16	465	34	31,2	467	286	1476	25	29	344	141	1172	332
450	52	.0450.052.	250	99	101	16	520	37	39,6	520	104	1851	12	3,7	954	491	30826	1275
450	91	.0450.091.	328	110	114	16	520	37	39,6	520	182	1851	19	11	545	280	5753	729
450	143	.0450.143.	432	123	129	16	520	37	39,6	520	286	1851	24	28	347	178	1483	464
500	48	.0500.048.	232	123	125	16	570	38	51,8	576	84	2282	9,9	2,5	1128	715	68986	2169
500	96	.0500.096.	316	135	140	16	570	38	51,8	576	168	2282	18	10	564	357	8616	1085
500	144	.0500.144.	400	148	154	16	570	38	51,8	576	252	2282	24	22	376	238	2553	723

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 25...**

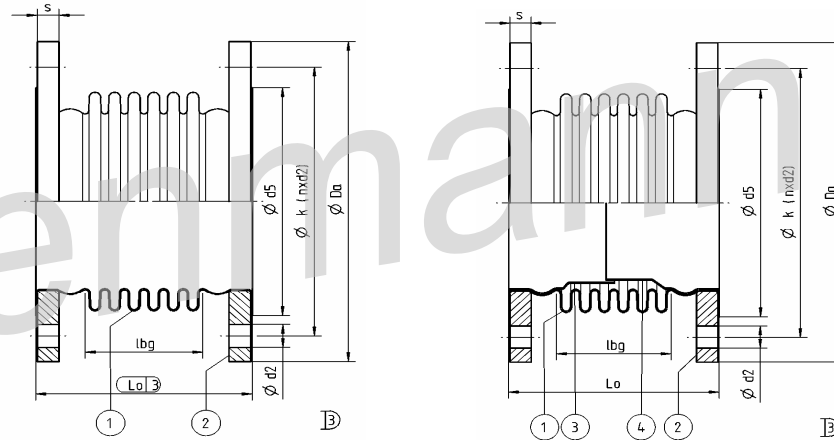


### PN 25

Nominal diameter	Nominal axial movement absorption	Type  ABN 25 ...	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thickness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	13	.0050.013.	120	6	6	40	92	20	2,6	90	40	46,6	19	2,3	401	5,2	2173	3,6
50	29	.0050.029.	179	7	7	40	92	20	2,6	91	99	47,2	32	12	221	2,9	198	1,9
65	17	.0065.017.	128	8	8	40	107	22	3,3	109	44	70,1	19	2,6	340	6,6	2311	6,3
65	40	.0065.040.	218	9	9	40	107	22	3,2	111	132	71,6	33	18	218	4,3	166	3,6
80	23	.0080.023.	148	10	10	40	122	24	4	123	60	90,8	22	4,2	329	8,3	1555	8,6
80	42	.0080.042.	219	11	11	40	122	24	4	125	130	92,5	32	17	222	5,7	227	5,5
100	23	.0100.023.	140	12	13	40	147	24	5,3	151	52	140	18	3	340	13	3302	19
100	48	.0100.048.	215	14	15	40	147	24	5,3	152	126	141	30	15	218	8,5	361	11
125	26	.0125.026.	167	17	18	40	178	26	7,5	174	64	187	18	3,6	450	23	3864	36
125	52	.0125.052.	231	19	19	40	178	26	7,5	174	128	187	29	14	225	12	483	18
150	29	.0150.029.	171	22	22	40	208	28	9,4	205	64	267	17	3,4	440	33	5410	62
150	58	.0150.058.	235	23	24	40	208	28	9,4	205	128	267	27	14	220	16	676	31

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 25...**

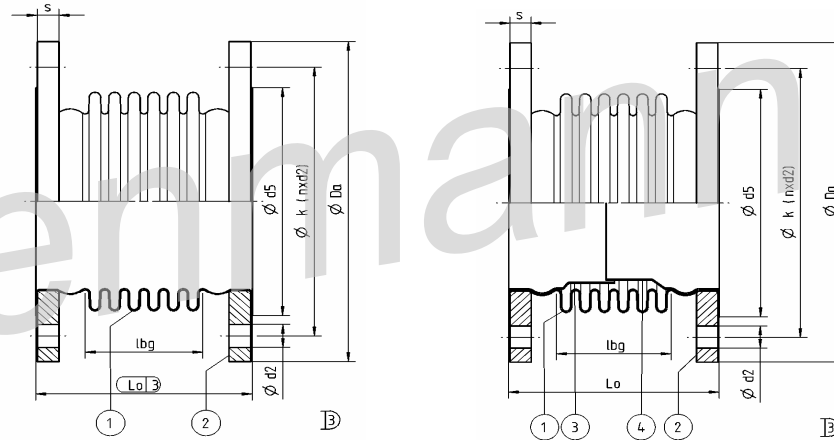


### PN 25

Nominal diameter	Nominal axial movement absorption	Type  ABN 25 ...	Overall length	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup>		Verstellkraft rate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thickness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	d5	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
200	26	.0200.026.	186	32	33	25	258	32	14,1	261	72	443	12	2,6	855	105	13759	124
200	46	.0200.046.	240	35	36	25	258	32	14,1	261	126	443	18	8	489	60	2569	71
200	71	.0200.071.	313	39	41	25	258	32	13,9	262	198	445	23	20	376	46	802	54
250	24	.0250.024.	191	45	46	25	320	35	19,7	320	60	679	9	1,6	1298	245	46135	353
250	48	.0250.048.	251	49	50	25	320	35	19,7	320	120	679	16	6,5	649	122	5762	177
250	79	.0250.079.	331	54	56	25	320	35	19,7	320	200	679	21	18	390	74	1245	106
300	27	.0300.027.	203	60	61	25	375	38	26,2	374	66	940	8,7	1,7	1200	313	48892	542
300	55	.0300.055.	269	65	66	25	375	38	26,2	374	132	940	16	7	600	157	6112	271
300	82	.0300.082.	335	69	72	25	375	38	26,2	374	198	940	19	16	400	104	1809	181
350	30	.0350.030.	219	93	95	25	410	42	40,6	412	72	1140	8,8	1,9	1445	458	59854	890
350	50	.0350.050.	267	98	100	25	410	42	40,6	412	120	1140	14	5,2	867	275	12928	534
350	80	.0350.080.	339	105	108	25	410	42	40,6	412	192	1140	19	13	542	172	3154	334

## Axial expansion joints with swivel lap-joint flanges

Type **ABN 25...**



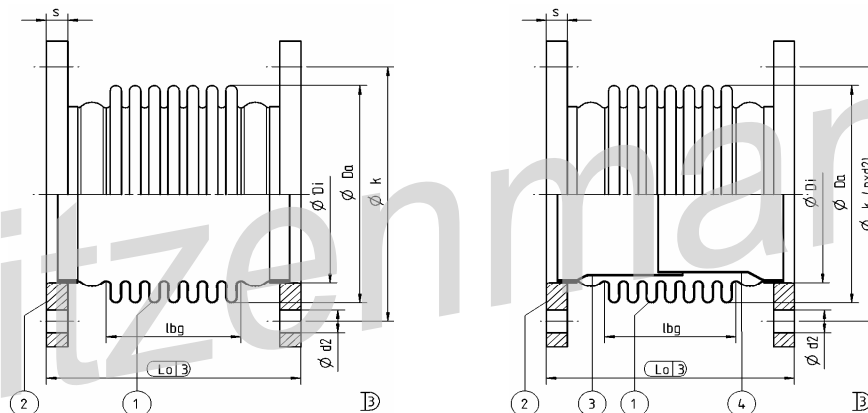
Nominal diameter	Nominal axial movement absorption	Type <b>ABN 25 ...</b>	Overall length $L_o$	Weight approx.		Flange				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Verstellkraftrate			Torsionssteifigkeit
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	$L_o$	G	G	PN	d5	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
400	32	.0400.032.	256	116	118	25	465	42	48,9	466	100	1473	8,1	2,5	1934	791	53659	986
400	56	.0400.056.	331	125	128	25	465	42	48,9	466	175	1473	13	7,5	1105	452	10010	563
400	96	.0400.096.	482	149	155	25	465	42	48,9	469	324	1483	18	24	700	288	1859	369

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

# Axial expansion joints for low pressure with plain fixed flanges

Type            **AFG 01...**

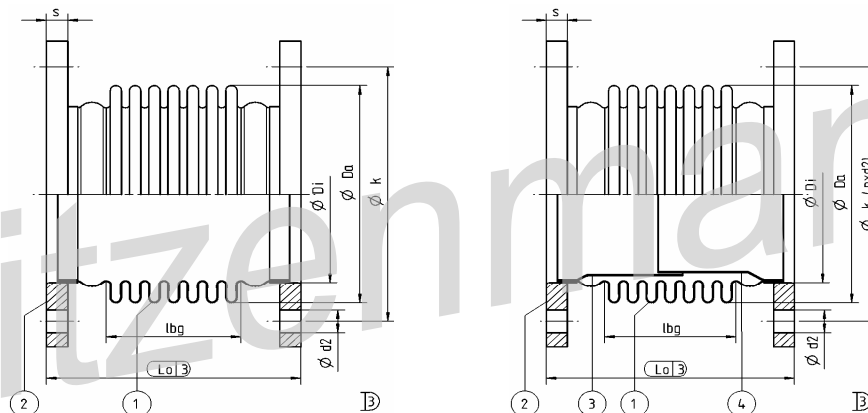


## PN 1

Nominal diameter	Nominal axial movement absorption	Type  AFG 01 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick- ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup> lateral <sup>1)</sup>			axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm²	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
50	20	.0050.020.	123	2	2	6	10	0,9	89	45	46	30	3,9	0,3	105	1,3	451	420	1800	1,1
50	56	.0050.056.	204	2	3	6	10	0,9	89	126	46	50	31	0,3	37	0,5	20	150	230	0,4
50	80	.0050.080.	258	2	3	6	10	0,9	89	180	46	50	63	0,3	26	0,3	7	105	110	0,3
65	23	.0065.023.	123	3	3	6	10	1,1	107	45	68,7	28	3,7	0,3	102	1,9	654	350	1840	2,1
65	64	.0065.064.	204	3	3	6	10	1,1	107	126	68,7	50	29	0,3	36	0,7	30	125	235	0,7
65	92	.0065.092.	258	3	4	6	10	1,1	107	180	68,7	50	59	0,3	25	0,5	10	90	115	0,5
80	37	.0080.037.	148	4	4	6	10	1,6	121	70	89,1	39	8,1	0,3	67	1,7	233	220	840	2,1
80	69	.0080.069.	208	4	5	6	10	1,6	121	130	89,1	50	28	0,3	36	0,9	36	165	340	1,1
80	101	.0080.101.	268	4	5	6	10	1,6	121	190	89,1	50	60	0,3	25	0,6	12	80	115	0,8
100	40	.0100.040.	144	4	5	6	10	1,8	148	66	137	34	6,6	0,3	73	2,8	432	210	1050	4,4
100	79	.0100.079.	210	5	5	6	10	1,8	148	132	137	50	26	0,3	36	1,4	54	90	220	2,2
100	112	.0100.112.	265	5	6	6	10	1,8	148	187	137	50	53	0,3	26	1	19	60	110	1,6

## Axial expansion joints for low pressure with plain fixed flanges

Type      **AFG 01...**



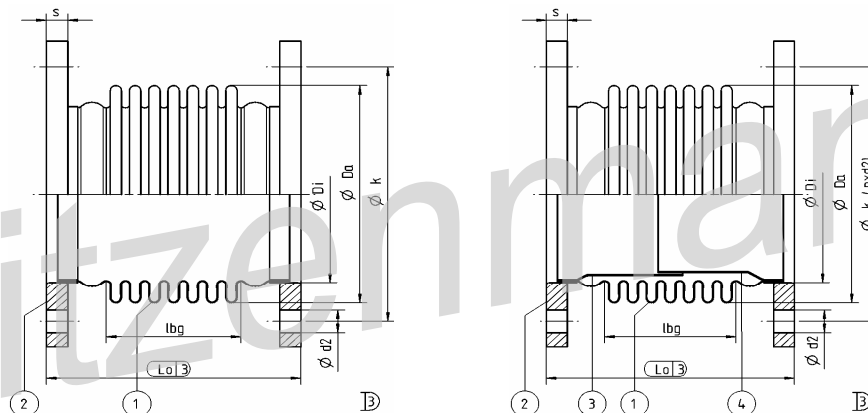
### PN 1

Nominal diameter	Nominal axial movement absorption	Type  <b>AFG 01 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
125	63	.0125.063.	179	5	6	6	10	2,2	174	91	187	45	12	0,3	41	2,1	177	120	520	4,9
125	117	.0125.117.	257	6	7	6	10	2,2	174	169	187	50	43	0,3	22	1,1	28	70	150	2,6
125	180	.0125.180.	348	6	8	6	10	2,2	174	260	187	50	101	0,3	14	0,7	7,4	40	65	1,7
150	54	.0150.054.	166	6	7	6	10	2,4	203	78	264	33	7,7	0,3	56	4,1	465	140	830	10
150	126	.0150.126.	270	7	8	6	10	2,4	203	182	264	50	42	0,3	24	1,8	37	60	150	4,4
150	180	.0150.180.	348	7	9	6	10	2,4	203	260	264	50	85	0,3	17	1,2	13	40	75	3,1
200	70	.0200.070.	199	12	13	6	16	5,2	255	105	432	33	10	0,3	53	6,4	397	110	600	18
200	120	.0200.120.	274	13	14	6	16	5,2	255	180	432	50	31	0,3	31	3,7	79	60	210	11
200	200	.0200.200.	394	14	16	6	16	5,2	255	300	432	50	85	0,3	19	2,3	17	40	75	6,4
250	72	.0250.072.	206	14	16	6	16	6,2	312	102	661	28	8,4	0,3	62	11	752	110	780	39
250	132	.0250.132.	291	15	18	6	16	6,2	312	187	661	47	28	0,3	34	6,2	123	60	230	21
250	204	.0250.204.	393	17	20	6	16	6,2	312	289	661	50	68	0,3	22	4	33	40	100	14



## Axial expansion joints for low pressure with plain fixed flanges

Type        **AFG 01...**

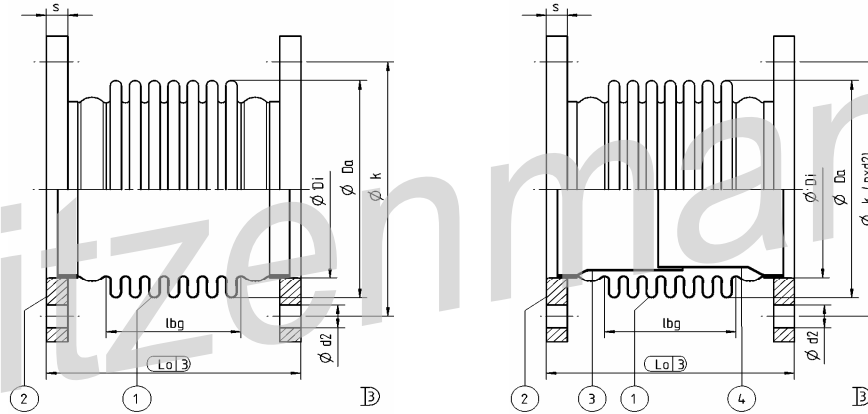


### PN 1

Nominal diameter	Nominal axial movement absorption	Type  AFG 01 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
300	56	.0300.056.	180	18	21	6	16	8,3	365	76	916	18	4,2	0,3	91	23	2756	140	1610	90
300	140	.0300.140.	294	20	24	6	16	8,3	365	190	916	43	26	0,3	36	9,2	174	60	260	36
300	210	.0300.210.	389	21	27	6	16	8,3	365	285	916	50	58	0,3	24	6,1	52	40	115	24
350	60	.0350.060.	184	23	26	6	16	10,7	400	80	1104	18	4,3	0,3	82	25	2703	120	1490	113
350	120	.0350.120.	264	24	28	6	16	10,7	400	160	1104	34	17	0,3	41	13	338	65	375	56
350	210	.0350.210.	384	26	32	6	16	10,7	400	280	1104	50	52	0,3	24	7,4	62	35	120	32
400	65	.0400.065.	219	28	32	6	16	11,7	458	105	1445	17	5,3	0,3	212	85	5283	120	1260	199
400	104	.0400.104.	282	30	35	6	16	11,7	458	168	1445	27	14	0,3	132	53	1291	80	500	124
400	195	.0400.195.	429	35	43	6	16	11,7	458	315	1445	45	48	0,3	71	29	195	40	140	66
450	56	.0450.056.	202	32	36	6	16	13,6	513	88	1825	13	3,4	0,3	243	123	10935	130	1850	333
450	112	.0450.112.	290	35	41	6	16	13,6	513	176	1825	26	14	0,3	122	62	1361	70	460	167
450	196	.0450.196.	422	40	49	6	16	13,6	513	308	1825	41	42	0,3	70	35	253	40	150	95

## Axial expansion joints for low pressure with plain fixed flanges

Type            **AFG 01...**

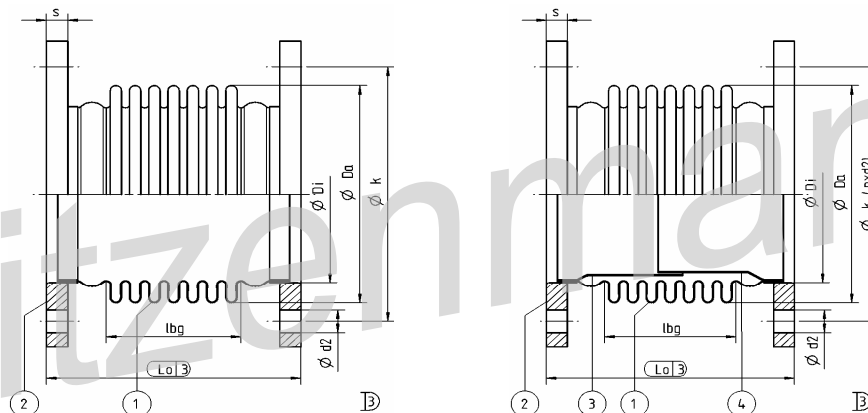


### PN 1

Nominal diameter	Nominal axial movement absorption	Type  <b>AFG 01 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
500	68	.0500.068.	206	34	39	6	16	14,6	569	92	2252	14	3,9	0,3	215	135	10875	115	1690	427
500	119	.0500.119.	275	37	44	6	16	14,6	569	161	2252	24	12	0,3	123	77	2025	70	550	244
500	221	.0500.221.	413	43	53	6	16	14,6	569	299	2252	42	41	0,3	66	41	318	35	160	131
600	76	.0600.076.	222	52	58	6	20	22,7	674	104	3202	14	4,1	0,3	215	191	12099	100	1570	689
600	133	.0600.133.	300	56	64	6	20	22,7	674	182	3202	23	13	0,3	123	109	2252	60	510	394
600	228	.0600.228.	430	62	74	6	20	22,7	674	312	3202	36	37	0,3	72	64	446	35	175	230
700	80	.0700.080.	230	62	68	6	20	26,7	780	112	4324	12	4	0,3	203	244	13365	90	1480	1022
700	120	.0700.120.	286	65	74	6	20	26,7	780	168	4324	18	9,1	0,3	135	162	3950	60	660	681
700	220	.0700.220.	426	73	86	6	20	26,7	780	308	4324	30	30	0,3	74	89	644	30	195	372
800	84	.0800.084.	244	76	84	6	20	33,1	882	116	5588	11	3,9	0,3	220	341	17449	85	1570	1502
800	126	.0800.126.	302	79	90	6	20	33,1	882	174	5588	16	8,7	0,3	147	228	5182	60	700	1001
800	231	.0800.231.	447	89	105	6	20	33,1	882	319	5588	28	29	0,3	80	124	839	30	210	546

## Axial expansion joints for low pressure with plain fixed flanges

Type      **AFG 01...**

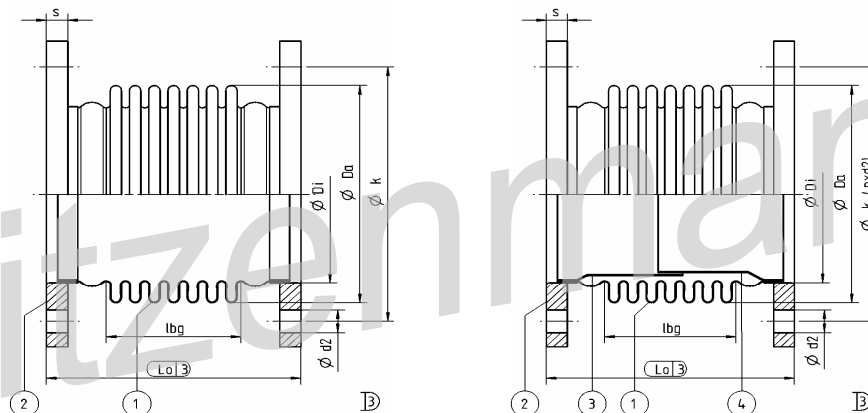


### PN 1

Nominal diameter	Nominal axial movement absorption	Type  AFG 01 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick- ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm²	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
900	84	.0900.084.	248	80	90	6	20	34,6	992	120	7133	9,9	3,5	0,3	238	472	22421	80	1650	2161
900	126	.0900.126.	308	85	97	6	20	34,6	992	180	7133	15	7,9	0,3	158	313	6643	60	730	1441
900	210	.0900.210.	428	93	111	6	20	34,6	992	300	7133	23	22	0,3	95	188	1438	30	260	865
1000	72	.1000.072.	234	85	95	6	20	37,3	1095	96	8750	7,7	2,2	0,3	335	814	60745	105	2940	3869
1000	144	.1000.144.	330	92	107	6	20	37,3	1095	192	8750	15	8,7	0,3	168	408	7570	50	740	1935
1000	240	.1000.240.	458	102	123	6	20	37,3	1095	320	8750	23	24	0,3	101	245	1632	30	265	1161
1200	72	.1200.072.	241	105	122	2	20	46	1295	93	12331	6,5	1,8	0,3	331	1134	89855	95	3210	6261
1200	120	.1200.120.	303	111	133	2	20	46	1295	155	12331	11	4,9	0,3	198	678	19409	60	1160	3757
1200	216	.1200.216.	427	123	155	2	20	46	1295	279	12331	18	16	0,3	110	377	3328	30	360	2087
1400	48	.1400.048.	152	122	134	2	20	55,7	1456	104	16016	3,8	1,2	0,3	922	4053	257632	150	5320	10507
1400	108	.1400.108.	282	134	158	2	20	55,7	1456	234	16016	8,4	5,9	0,3	410	1802	22624	70	1050	4670
1400	180	.1400.180.	438	149	186	2	20	55,7	1456	390	16016	13	16	0,3	246	1081	4887	40	380	2802

## Axial expansion joints for low pressure with plain fixed flanges

Type            **AFG 01...**

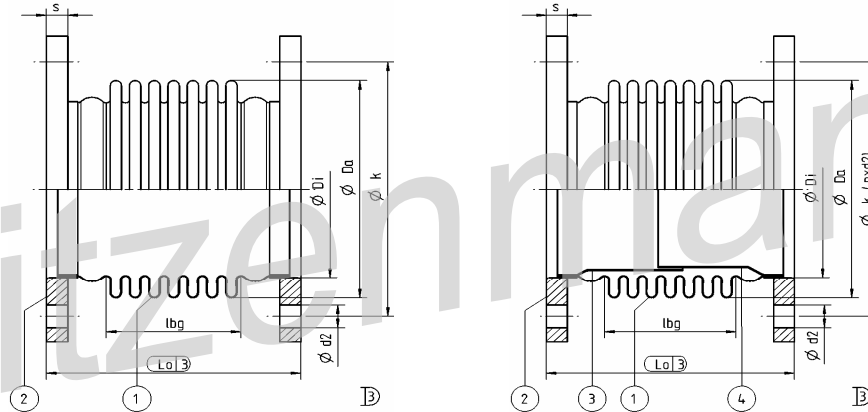


### PN 1

Nominal diameter	Nominal axial movement absorption	Type  <b>AFG 01 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
1600	48	.1600.048.	152	152	166	2	20	69,8	1656	104	20816	3,4	1	0,3	1046	5990	380429	150	6040	15684
1600	108	.1600.108.	282	166	193	2	20	69,8	1656	234	20816	7,4	5,2	0,3	465	2660	33398	70	1200	6970
1600	180	.1600.180.	438	182	225	2	20	69,8	1656	390	20816	12	14	0,3	279	1596	7214	40	430	4182
1800	48	.1800.048.	152	170	186	2	20	78,1	1856	104	26245	3	0,9	0,3	1170	8449	536643	150	6760	22331
1800	108	.1800.108.	282	185	216	2	20	78,1	1856	234	26245	6,6	4,6	0,3	520	3754	47143	70	1340	9925
1800	180	.1800.180.	438	204	252	2	20	78,1	1856	390	26245	11	13	0,3	312	2253	10183	40	480	5955
2000	48	.2000.048.	152	188	206	2	20	86,4	2056	104	32302	2,7	0,8	0,3	1292	11503	730650	150	7480	30632
2000	108	.2000.108.	282	205	239	2	20	86,4	2056	234	32302	6	4,2	0,3	574	5114	64107	70	1480	13614
2000	180	.2000.180.	438	226	279	2	20	86,4	2056	390	32302	9,6	12	0,3	345	3069	13872	40	530	8169
2200	48	.2200.048.	152	221	241	2	20	102,3	2256	104	38987	2,5	0,7	0,3	1414	15205	965857	150	8200	40771
2200	108	.2200.108.	282	240	279	2	20	102,3	2256	234	38987	5,4	3,8	0,3	628	6758	84718	70	1620	18121
2200	180	.2200.180.	438	263	323	2	20	102,3	2256	390	38987	8,8	11	0,3	377	4050	18309	40	580	10872

## Axial expansion joints for low pressure with plain fixed flanges

Type            **AFG 01...**



### PN 1

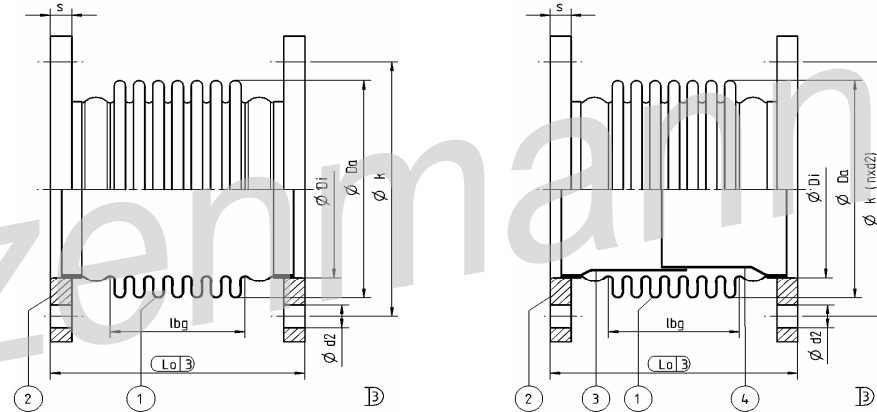
Nominal diameter	Nominal axial movement absorption	Type  <b>AFG 01 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
				G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>		c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
2400	48	.2400.048.	152	241	262	2	20	111,3	2456	104	46301	2,3	0,7	0,3	1536	19613	1245968	150	8900	52932
2400	108	.2400.108.	282	262	304	2	20	111,3	2456	234	46301	5	3,5	0,3	683	8720	109332	70	1760	23525
2400	180	.2400.180.	438	286	351	2	20	111,3	2456	390	46301	8,1	9,6	0,3	410	5235	23604	40	630	14115
2600	48	.2600.048.	152	260	283	2	20	120,2	2656	104	54243	2,1	0,6	0,3	1657	24816	1576541	150	9620	67298
2600	108	.2600.108.	282	283	328	2	20	120,2	2656	234	54243	4,6	3,2	0,3	737	11029	138302	70	1900	29910
2600	180	.2600.180.	438	309	380	2	20	120,2	2656	390	54243	7,5	8,9	0,3	442	6615	29900	40	680	17946
2800	48	.2800.048.	152	313	338	2	20	146,1	2856	104	62813	1,9	0,6	0,3	1778	30848	1959837	150	10330	84054
2800	108	.2800.108.	282	338	387	2	20	146,1	2856	234	62813	4,3	3	0,3	790	13714	171984	65	2040	37357
2800	180	.2800.180.	438	367	443	2	20	146,1	2856	390	62813	7	8,3	0,3	474	8218	37149	40	740	22414
3000	48	.3000.048.	152	335	362	2	20	156,2	3056	104	72011	1,8	0,5	0,3	1900	37786	2400702	150	11050	103383
3000	108	.3000.108.	282	361	414	2	20	156,2	3056	234	72011	4	2,8	0,3	844	16803	210733	65	2180	45948
3000	180	.3000.180.	438	392	474	2	20	156,2	3056	390	72011	6,5	7,7	0,3	507	10082	45573	40	790	27569

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with plain fixed flanges

Type            **AFN 02...**

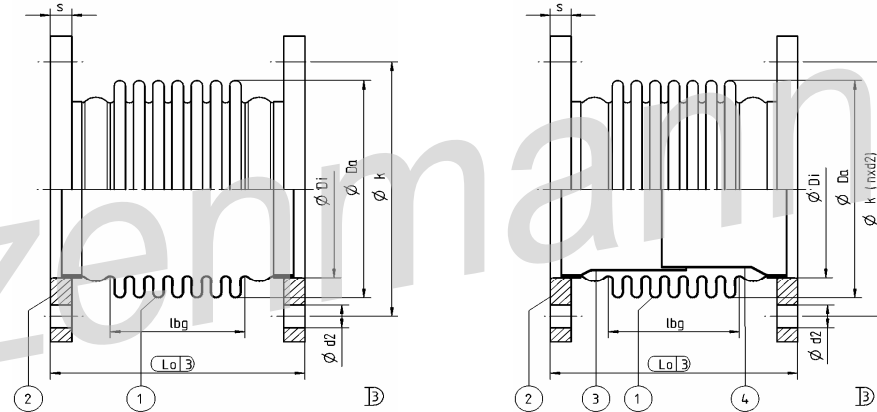


### PN 2,5

Nominal diameter	Nominal axial movement absorption	Type  AFN 02 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	20	.0050.020.	129	3	3	6	16	1,4	89	45	46	29	3,9	105	1,3	451	1,1
50	40	.0050.040.	174	3	3	6	16	1,4	89	90	46	50	16	52	0,7	56	0,6
50	70	.0050.070.	255	4	4	6	16	1,4	89	171	46	50	52	46	0,6	14	0,5
65	23	.0065.023.	129	4	4	6	16	1,8	107	45	68,7	28	3,7	102	1,9	654	2,1
65	60	.0065.060.	201	4	5	6	16	1,8	107	117	68,7	50	25	39	0,7	37	0,8
65	87	.0065.087.	274	5	6	6	16	1,8	108	190	69,4	50	59	40	0,8	14	0,8
80	27	.0080.027.	136	6	6	6	18	2,8	121	50	89,1	28	4,1	94	2,3	640	2,9
80	64	.0080.064.	206	6	7	6	18	2,8	121	120	89,1	50	24	39	1	46	1,2
80	92	.0080.092.	284	7	8	6	18	2,8	121	198	89,1	50	57	43	1,1	18	1,2
100	46	.0100.046.	163	7	7	6	18	3,2	148	77	137	38	9	63	2,4	273	3,8
100	73	.0100.073.	207	7	8	6	18	3,2	148	121	137	50	22	40	1,5	71	2,4
100	98	.0100.098.	294	9	10	6	18	3,1	150	208	139	50	51	71	2,7	43	4

## Axial expansion joints with plain fixed flanges

Type            **AFN 02...**

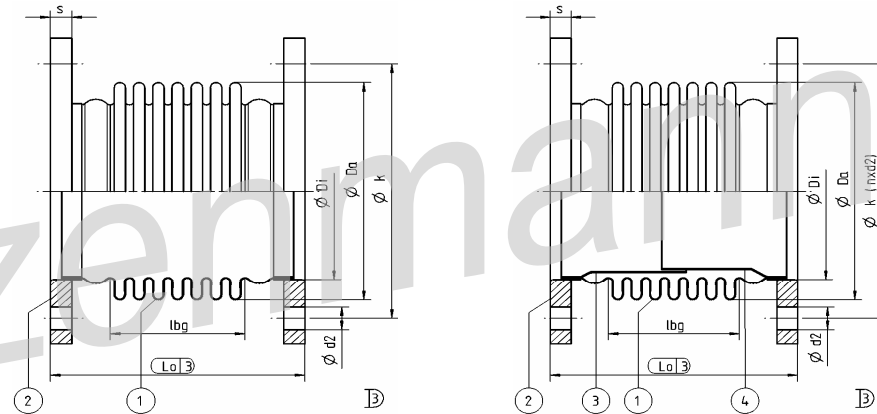


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  AFN 02 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
125	45	.0125.045.	163	9	10	6	20	4,4	174	65	187	32	6,3	58	3	492	6,9
125	81	.0125.081.	215	10	11	6	20	4,4	174	117	187	50	20	32	1,7	84	3,8
125	140	.0125.140.	378	13	15	6	20	4,3	172	280	185	50	85	53	2,7	23	4,6
150	45	.0150.045.	163	10	11	6	20	4,8	203	65	264	27	5,3	68	5	801	12
150	81	.0150.081.	215	11	12	6	20	4,8	203	117	264	46	17	38	2,8	137	6,9
150	160	.0150.160.	398	16	18	6	20	4,8	203	300	264	50	87	51	3,7	29	7,8
200	60	.0200.060.	190	15	16	6	22	6,9	255	90	432	28	7,7	62	7,4	631	21
200	110	.0200.110.	276	17	18	6	22	6,9	256	176	434	47	27	50	6	134	17
200	190	.0200.190.	423	22	25	6	22	6,9	257	323	436	50	87	51	6,2	41	16
250	72	.0250.072.	214	20	21	6	24	9	312	102	661	27	8,4	62	11	752	39
250	120	.0250.120.	282	22	24	6	24	9	315	170	667	42	23	48	8,9	212	33
250	204	.0250.204.	418	29	32	6	24	9	316	306	670	50	71	50	9,3	67	32

## Axial expansion joints with plain fixed flanges

Type            **AFN 02...**



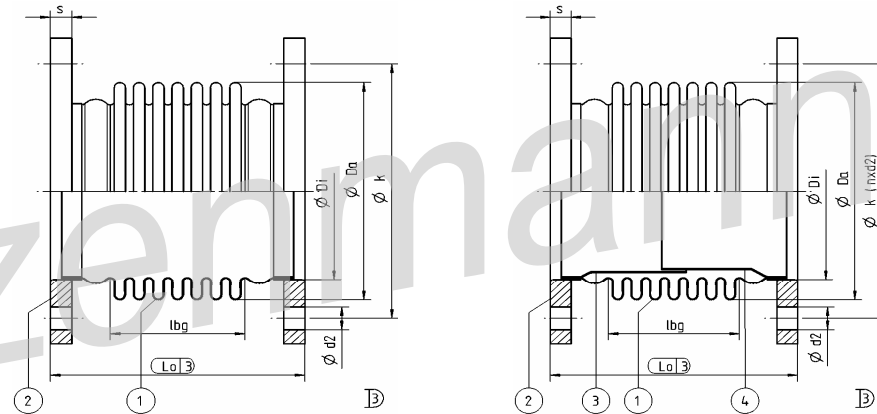
**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  AFN 02 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
300	56	.0300.056.	188	26	28	6	24	12,2	365	76	916	18	4,2	91	23	2756	90
300	126	.0300.126.	283	27	31	6	24	12,2	365	171	916	36	21	40	10	239	40
300	210	.0300.210.	392	36	41	6	24	12,2	371	280	932	50	57	52	13	118	59
350	60	.0350.060.	194	36	39	6	26	17,1	400	80	1104	18	4,3	82	25	2703	113
350	120	.0350.120.	274	39	43	6	26	17,1	402	160	1110	33	17	58	18	480	83
350	210	.0350.210.	408	47	53	6	26	17,1	402	294	1110	50	55	60	19	147	79
400	65	.0400.065.	225	45	49	6	28	20,4	458	105	1445	17	5,3	212	85	5283	199
400	104	.0400.104.	288	47	52	6	28	20,4	458	168	1445	26	14	132	53	1291	124
400	182	.0400.182.	414	51	59	6	28	20,4	458	294	1445	38	42	76	31	240	71
450	56	.0450.056.	208	51	54	6	28	23,3	513	88	1825	13	3,4	243	123	10935	333
450	112	.0450.112.	296	54	60	6	28	23,3	513	176	1825	24	14	122	62	1361	167
450	182	.0450.182.	406	58	67	6	28	23,3	513	286	1825	34	36	75	38	320	103



## Axial expansion joints with plain fixed flanges

Type            **AFN 02...**

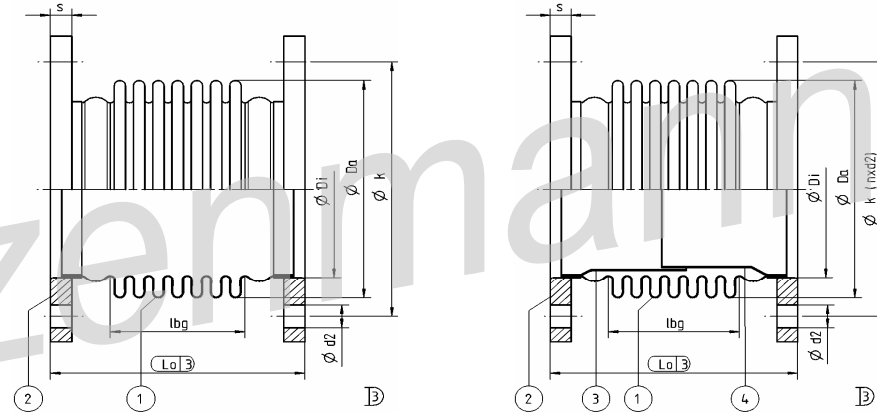


### PN 2,5

Nominal diameter	Nominal axial movement absorption	Type  AFN 02 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
500	68	.0500.068.	212	55	60	6	28	25,1	569	92	2252	14	3,9	215	135	10875	427
500	119	.0500.119.	281	58	65	6	28	25,1	569	161	2252	24	12	123	77	2025	244
500	204	.0500.204.	396	63	72	6	28	25,1	569	276	2252	35	35	72	45	401	142
600	76	.0600.076.	232	77	83	6	32	35,4	674	104	3202	13	4,1	215	191	12099	689
600	114	.0600.114.	284	80	87	6	32	35,4	674	156	3202	19	9,3	143	127	3593	460
600	209	.0600.209.	414	86	97	6	32	35,4	674	286	3202	30	31	78	69	583	251
700	80	.0700.080.	240	94	101	6	32	42,7	780	112	4324	12	4	203	244	13365	1022
700	120	.0700.120.	296	97	106	6	32	42,7	780	168	4324	17	9,1	135	162	3950	681
700	220	.0700.220.	436	105	118	6	32	42,7	780	308	4324	27	30	74	89	644	372
800	63	.0800.063.	227	120	125	6	34	56,2	882	87	5588	8,4	2,2	294	456	41313	2003
800	126	.0800.126.	314	126	137	6	34	56,2	882	174	5588	16	8,7	147	228	5182	1001
800	210	.0800.210.	430	133	148	6	34	56,2	882	290	5588	23	24	88	137	1117	601

## Axial expansion joints with plain fixed flanges

Type            **AFN 02...**

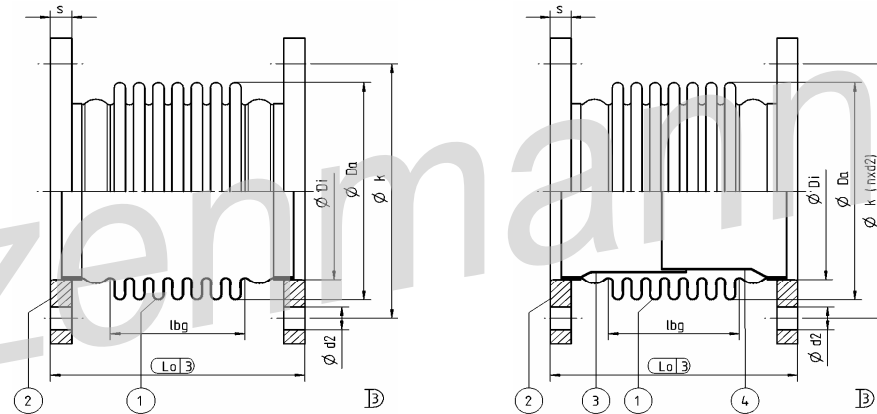


### PN 2,5

Nominal diameter	Nominal axial movement absorption	Type  AFN 02 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
900	63	.0900.063.	232	130	136	6	35	60,5	992	90	7133	7,4	2	317	628	53147	2882
900	126	.0900.126.	322	137	149	6	35	60,5	992	180	7133	14	7,9	158	313	6643	1441
900	210	.0900.210.	442	145	163	6	35	60,5	992	300	7133	21	22	95	188	1438	865
1000	72	.1000.072.	252	148	156	6	37	69,1	1095	96	8750	7,7	2,2	335	814	60745	3869
1000	120	.1000.120.	316	153	167	6	37	69,1	1095	160	8750	12	6,1	201	489	13121	2322
1000	240	.1000.240.	476	165	187	6	37	69,1	1095	320	8750	21	24	101	245	1632	1161
1200	72	.1200.072.	266	204	215	2	40	92,1	1295	96	12331	6,5	1,8	511	1750	130579	9432
1200	120	.1200.120.	330	213	236	2	40	92,1	1295	160	12331	11	5,1	307	1052	28150	5659
1200	216	.1200.216.	458	231	263	2	40	92,1	1295	288	12331	18	17	170	582	4827	3144
1400	48	.1400.048.	178	245	257	2	42	117	1456	104	16016	3,8	1,2	922	4053	257632	10507
1400	108	.1400.108.	308	257	280	2	42	117	1456	234	16016	8,2	5,9	410	1802	22624	4670
1400	180	.1400.180.	464	271	310	2	42	117	1456	390	16016	12	16	246	1081	4887	2802

## Axial expansion joints with plain fixed flanges

Type **AFN 02...**



**PN 2,5**

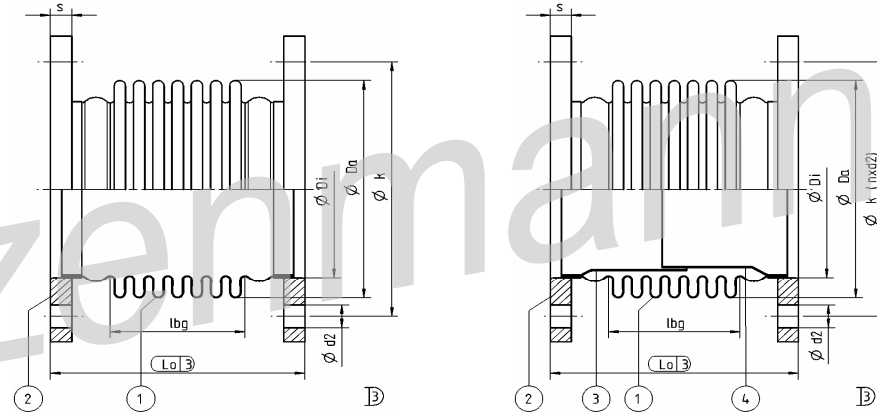
Nominal diameter	Nominal axial movement absorption	Type  AFN 02 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
1600	48	.1600.048.	186	333	347	2	46	160,6	1656	104	20816	3,3	1	1046	5990	380429	15684
1600	108	.1600.108.	316	347	374	2	46	160,6	1656	234	20816	7,2	5,2	465	2660	33398	6970
1600	180	.1600.180.	472	364	408	2	46	160,6	1656	390	20816	11	14	279	1596	7214	4182
1800	48	.1800.048.	194	404	420	2	50	195,3	1856	104	26245	3	0,9	1170	8449	536643	22331
1800	108	.1800.108.	324	420	450	2	50	195,3	1856	234	26245	6,4	4,6	520	3754	47143	9925
1800	180	.1800.180.	480	438	488	2	50	195,3	1856	390	26245	9,9	13	312	2253	10183	5955
2000	48	.2000.048.	198	465	482	2	52	224,7	2056	104	32302	2,7	0,8	1292	11503	730650	30632
2000	108	.2000.108.	328	482	516	2	52	224,7	2056	234	32302	5,9	4,2	574	5114	64107	13614
2000	180	.2000.180.	484	502	558	2	52	224,7	2056	390	32302	9,1	12	345	3069	13872	8169

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with plain fixed flanges

Type **AFN 06...**

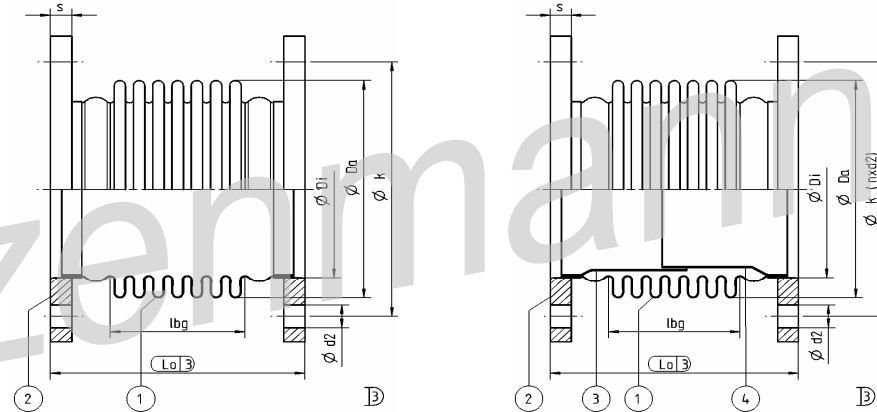


### PN 6

Nominal diameter	Nominal axial movement absorption	Type  AFN 06 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	20	.0050.020.	129	3	3	6	16	1,4	89	45	46	28	3,9	105	1,3	451	1,1
50	52	.0050.052.	210	4	4	6	16	1,4	89	126	46	50	28	62	0,8	34	0,6
65	23	.0065.023.	129	4	4	6	16	1,8	107	45	68,7	27	3,7	102	1,9	654	2,1
65	41	.0065.041.	165	4	4	6	16	1,8	107	81	68,7	42	12	56	1,1	112	1,2
65	72	.0065.072.	282	6	7	6	16	1,7	110	198	70,9	50	50	91	1,8	30	1,7
80	27	.0080.027.	136	6	6	6	18	2,8	121	50	89,1	27	4,1	94	2,3	640	2,9
80	42	.0080.042.	166	6	7	6	18	2,8	121	80	89,1	38	11	59	1,5	154	1,8
80	77	.0080.077.	290	8	9	6	18	2,8	123	204	90,8	50	48	97	2,4	40	2,5
100	33	.0100.033.	141	7	7	6	18	3,2	148	55	137	27	4,6	88	3,3	752	5,3
100	59	.0100.059.	194	8	8	6	18	3,2	149	108	138	43	16	71	2,7	160	4,3
100	87	.0100.087.	281	10	11	6	18	3,1	151	195	140	50	42	91	3,5	63	5,1
125	36	.0125.036.	150	9	10	6	20	4,4	174	52	187	25	4	72	3,7	953	8,6
125	63	.0125.063.	189	10	10	6	20	4,4	174	91	187	39	12	41	2,1	177	4,9
125	98	.0125.098.	308	13	14	6	20	4,3	173	210	186	50	45	89	4,6	71	7,8

## Axial expansion joints with plain fixed flanges

Type            **AFN 06...**

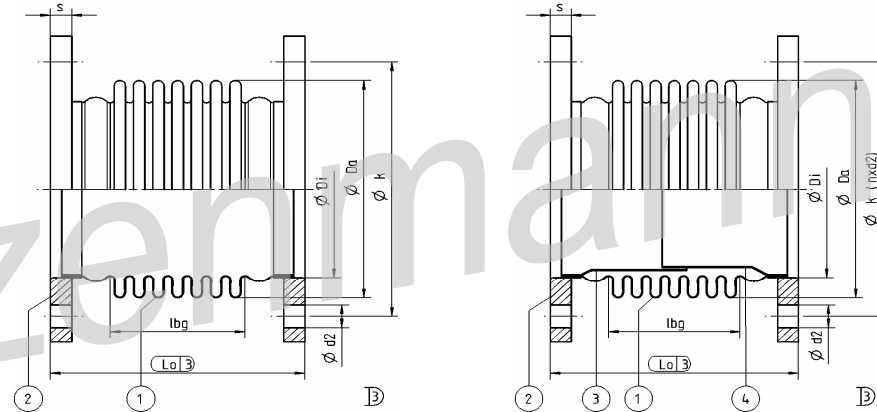


### PN 6

Nominal diameter	Nominal axial movement absorption	Type  <b>AFN 06 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
150	40	.0150.040.	168	11	11	6	20	4,8	202	70	263	23	5,1	117	8,5	1189	19
150	72	.0150.072.	233	13	14	6	20	4,8	203	135	264	39	18	114	8,4	313	17
150	124	.0150.124.	370	18	20	6	20	4,6	205	272	267	50	61	104	7,7	70	14
200	40	.0200.040.	164	15	16	6	22	6,9	256	64	434	19	3,6	138	17	2791	47
200	80	.0200.080.	236	18	19	6	22	6,9	257	136	436	34	15	121	15	540	39
200	140	.0200.140.	352	24	26	6	22	6,7	260	252	441	50	50	110	13	145	34
250	48	.0250.048.	184	21	22	6	24	9	316	72	670	18	3,9	211	39	5156	138
250	84	.0250.084.	238	23	25	6	24	9	316	126	670	29	12	120	22	967	79
250	144	.0250.144.	352	30	33	6	24	8,8	319	240	677	45	39	110	21	245	70
300	60	.0300.060.	192	28	31	6	24	12,2	371	80	932	19	4,6	183	47	5062	207
300	90	.0300.090.	232	30	33	6	24	12,2	371	120	932	27	10	122	32	1496	138
300	135	.0300.135.	310	37	41	6	24	11,9	374	198	940	39	26	128	33	582	142

## Axial expansion joints with plain fixed flanges

Type            **AFN 06...**

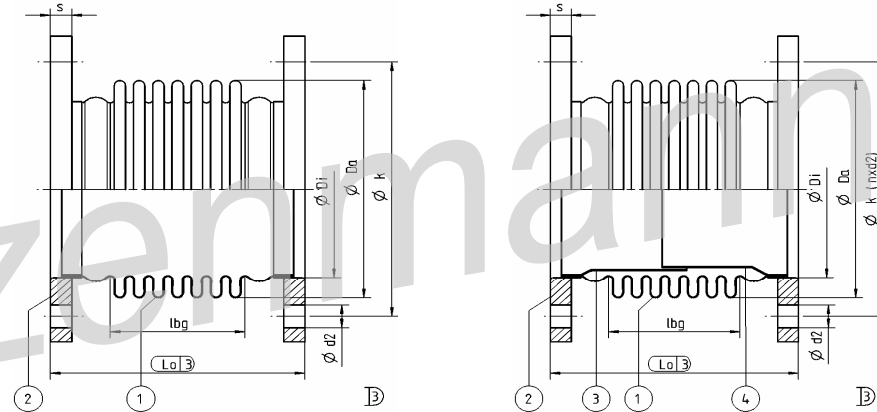


### PN 6

Nominal diameter	Nominal axial movement absorption	Type  <b>AFN 06 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
350	45	.0350.045.	177	38	40	6	26	17,1	402	63	1110	13	2,5	282	87	15014	371
350	105	.0350.105.	261	41	45	6	26	17,1	402	147	1110	28	14	121	37	1178	159
350	165	.0350.165.	367	50	56	6	26	16,7	405	253	1119	40	37	120	37	397	156
400	52	.0400.052.	208	47	49	6	28	20,4	461	88	1456	13	3,5	361	146	12887	359
400	104	.0400.104.	296	51	56	6	28	20,4	461	176	1456	23	14	180	73	1606	179
400	169	.0400.169.	419	61	68	6	28	20,1	462	299	1459	32	39	148	60	461	146
450	56	.0450.056.	212	53	56	6	28	23,3	514	92	1828	13	3,6	366	186	15018	496
450	98	.0450.098.	281	57	62	6	28	23,3	514	161	1828	20	11	209	106	2802	283
450	182	.0450.182.	432	71	79	6	28	23,3	515	312	1832	30	39	150	76	539	202
500	66	.0500.066.	220	61	66	6	28	25,1	572	100	2265	14	4,1	414	260	17778	831
500	116	.0500.116.	295	67	74	6	28	25,1	572	175	2265	22	13	236	148	3319	475
500	198	.0500.198.	444	90	100	6	28	24,5	574	324	2273	33	40	208	131	856	410

## Axial expansion joints with plain fixed flanges

Type **AFN 06...**

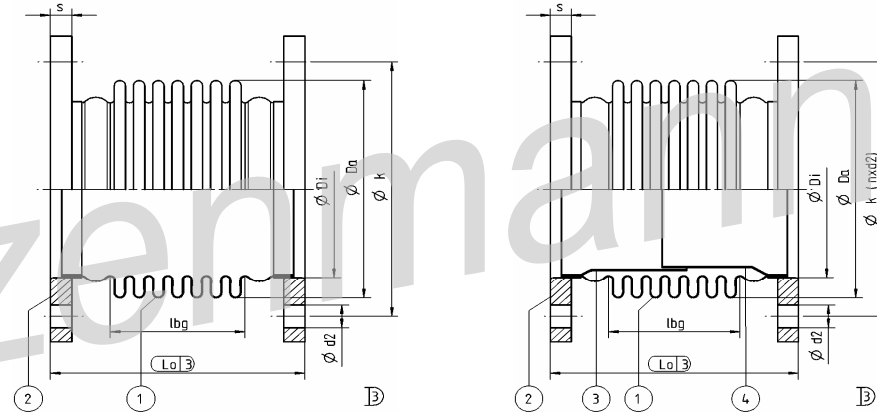


### PN 6

Nominal diameter	Nominal axial movement absorption	Type  AFN 06 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
600	76	.0600.076.	240	84	90	6	32	35,4	677	112	3217	13	4,4	414	370	20180	1344
600	114	.0600.114.	296	89	97	6	32	35,4	677	168	3217	19	10	276	247	5986	896
600	198	.0600.198.	447	117	129	6	32	34,7	678	319	3222	29	33	236	211	1421	737
700	60	.0700.060.	220	107	111	6	36	46,8	780	84	4324	9,1	2,3	585	703	68235	2788
700	120	.0700.120.	304	116	125	6	36	46,8	780	168	4324	17	9,1	293	352	8544	1394
700	200	.0700.200.	436	145	158	6	36	45,8	783	300	4342	25	27	255	308	2331	1225
800	63	.0800.063.	245	141	147	6	37	58,5	887	99	5621	8,4	2,5	856	1337	93326	5800
800	105	.0800.105.	311	153	163	6	37	58,5	887	165	5621	14	6,8	514	803	20150	3480
800	210	.0800.210.	476	182	198	6	37	58,5	887	330	5621	23	27	257	401	2524	1740
900	63	.0900.063.	247	154	161	6	38	63,5	996	99	7163	7,4	2,2	953	1896	132463	8489
900	105	.0900.105.	313	168	179	6	38	63,5	996	165	7163	12	6	572	1138	28592	5093
900	210	.0900.210.	478	201	220	6	38	63,5	996	330	7163	20	24	286	569	3580	2547

## Axial expansion joints with plain fixed flanges

Type **AFN 06...**



**PN 6**

Nominal diameter	Nominal axial movement absorption	Type  <b>AFN 06 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
1000	66	.1000.066.	271	183	191	6	42	75,7	1100	105	8791	7	2,2	974	2379	147726	11286
1000	110	.1000.110.	341	198	212	6	42	75,7	1100	175	8791	11	6,1	584	1426	31909	6772
1000	198	.1000.198.	481	228	249	6	42	75,7	1100	315	8791	18	20	325	794	5466	3762
1200	69	.1200.069.	289	293	306	6	47	127,1	1296	105	12341	6,2	1,9	1092	3743	232590	18919
1200	115	.1200.115.	359	311	336	6	47	127,1	1296	175	12341	10	5,4	655	2245	50255	11351
1200	207	.1200.207.	499	347	382	6	47	127,1	1296	315	12341	16	17	364	1248	8622	6306

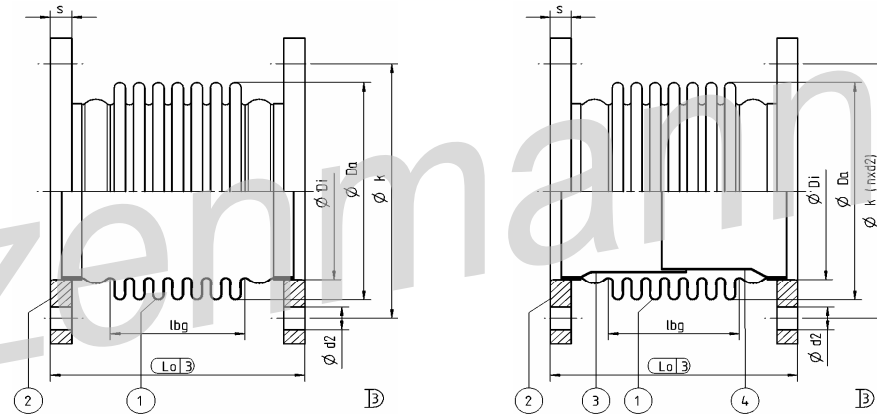
1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.



## Axial expansion joints with plain fixed flanges

Type            **AFN 10...**

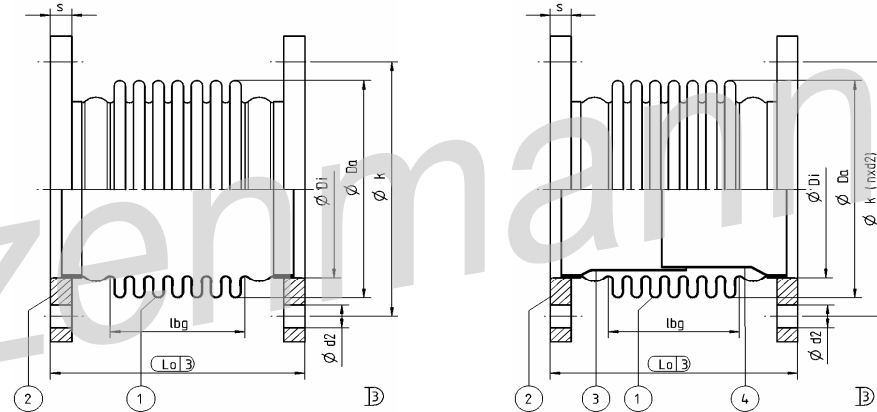


### PN 10

Nominal diameter	Nominal axial movement absorption	Type  AFN 10 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	24	.0050.024.	141	5	5	16	19	2,5	89	54	46	31	5,6	87	1,1	259	1
50	46	.0050.046.	227	6	6	16	19	2,4	90	140	46,6	50	28	115	1,5	51	1
65	18	.0065.018.	124	6	6	16	20	3	107	36	68,7	21	2,4	127	2,4	1275	2,6
65	48	.0065.048.	220	8	8	16	20	3	110	132	70,9	47	22	136	2,7	103	2,5
80	20	.0080.020.	132	7	8	16	20	3,5	121	44	89,1	21	2,8	192	4,8	1670	5,5
80	41	.0080.041.	176	8	8	16	20	3,5	121	88	89,1	36	11	96	2,4	209	2,8
80	54	.0080.054.	232	9	10	16	20	3,4	123	144	90,8	45	24	137	3,5	113	3,6
100	26	.0100.026.	138	9	9	16	22	4,2	149	48	138	22	3,2	161	6,2	1817	9,7
100	46	.0100.046.	174	9	10	16	22	4,2	149	84	138	33	9,8	92	3,5	340	5,6
100	80	.0100.080.	300	13	14	16	22	4,1	152	210	141	48	42	131	5,1	78	6,7
125	30	.0125.030.	156	12	12	16	22	5,5	171	56	184	21	3,7	148	7,6	1646	14
125	45	.0125.045.	184	12	13	16	22	5,5	171	84	184	29	8,2	99	5,1	488	9,2
125	85	.0125.085.	308	16	17	16	22	5,3	174	208	187	46	38	138	7,2	113	11

## Axial expansion joints with plain fixed flanges

Type            **AFN 10...**

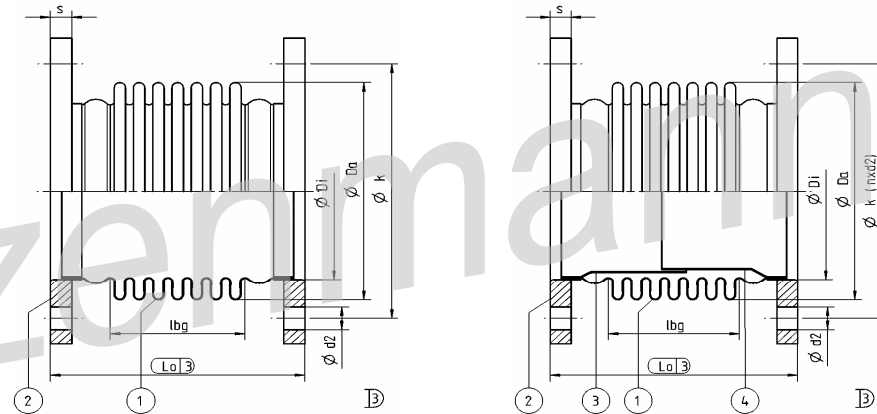


### PN 10

Nominal diameter	Nominal axial movement absorption	Type  AFN 10 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
150	32	.0150.032.	162	16	17	16	24	7,2	203	60	264	19	3,5	257	19	3564	39
150	64	.0150.064.	222	17	18	16	24	7,2	203	120	264	33	14	128	9,4	445	20
150	95	.0150.095.	310	21	22	16	24	7	205	208	267	43	36	136	10	157	19
200	40	.0200.040.	170	21	22	10	24	9,3	257	68	436	19	3,8	242	29	4318	78
200	80	.0200.080.	238	23	24	10	24	9,3	257	136	436	31	15	121	15	540	39
200	110	.0200.110.	300	27	29	10	24	9,1	260	198	441	41	31	140	17	297	44
250	48	.0250.048.	186	27	28	10	26	12	316	72	670	18	3,9	211	39	5156	138
250	84	.0250.084.	240	29	31	10	26	12	316	126	670	27	12	120	22	967	79
250	130	.0250.130.	418	41	44	10	26	11,7	319	304	677	32	45	201	38	278	56
300	45	.0300.045.	177	31	33	10	26	13,7	372	63	935	15	2,7	292	76	13045	326
300	90	.0300.090.	240	34	37	10	26	13,7	372	126	935	26	11	146	38	1631	163
300	137	.0300.137.	444	52	57	10	26	13,4	374	330	940	31	44	240	63	391	108

## Axial expansion joints with plain fixed flanges

Type            **AFN 10...**

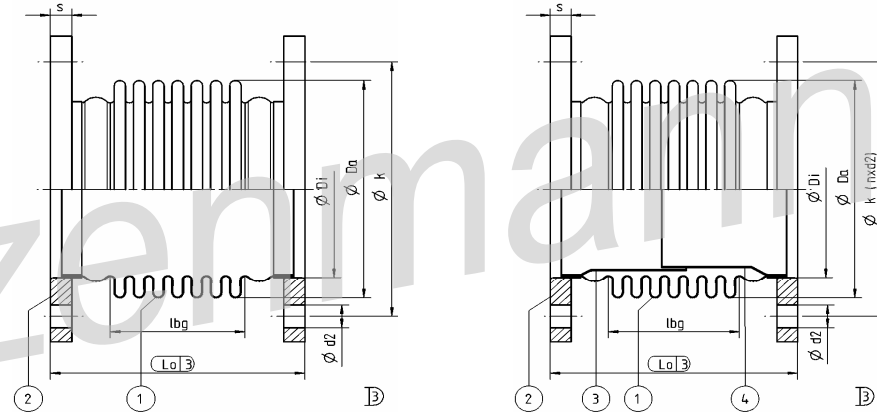


### PN 10

Nominal diameter	Nominal axial movement absorption	Type  AFN 10 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
350	60	.0350.060.	199	46	49	10	28	20,4	403	88	1113	17	4,7	251	78	6864	328
350	105	.0350.105.	265	49	53	10	28	20,4	403	154	1113	26	14	144	45	1282	188
350	150	.0350.150.	471	79	85	10	28	19,6	412	360	1140	32	47	289	92	479	178
400	48	.0400.048.	224	67	69	10	32	27,4	464	96	1466	12	3,6	730	297	21961	706
400	96	.0400.096.	320	75	80	10	32	27,4	464	192	1466	22	14	365	149	2749	353
400	156	.0400.156.	466	96	104	10	32	26,7	467	338	1476	31	41	291	119	708	281
450	70	.0450.070.	253	76	80	10	32	29,7	518	125	1844	16	6	564	289	12620	771
450	98	.0450.098.	303	81	87	10	32	29,7	518	175	1844	21	12	403	206	4599	551
450	182	.0450.182.	453	96	105	10	32	29,7	518	325	1844	29	41	217	111	717	297
500	66	.0500.066.	240	88	93	10	34	35,9	574	108	2273	14	4,4	625	395	23078	1229
500	116	.0500.116.	321	97	104	10	34	35,9	574	189	2273	22	14	357	225	4303	702
500	192	.0500.192.	468	125	135	10	34	35	576	336	2282	30	40	282	179	1077	542

## Axial expansion joints with plain fixed flanges

Type            **AFN 10...**



### PN 10

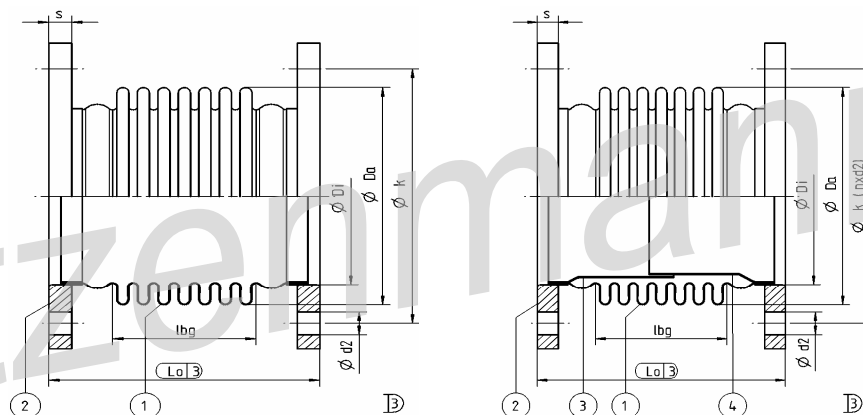
Nominal diameter	Nominal axial movement absorption	Type  AFN 10 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
600	72	.0600.072.	252	113	119	10	36	46,5	678	116	3222	12	4,3	649	581	29497	2027
600	108	.0600.108.	310	121	129	10	36	46,5	678	174	3222	17	9,8	433	388	8740	1351
600	198	.0600.198.	466	157	169	10	36	46	680	330	3232	27	34	318	286	1791	976
700	57	.0700.057.	240	155	159	10	40	64	785	96	4353	8,6	2,4	1142	1381	102304	5375
700	114	.0700.114.	336	174	184	10	40	64	785	192	4353	16	9,8	571	690	12788	2687
700	190	.0700.190.	464	201	215	10	40	64	785	320	4353	23	27	343	415	2761	1612

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with plain fixed flanges

Type            AFN 16...

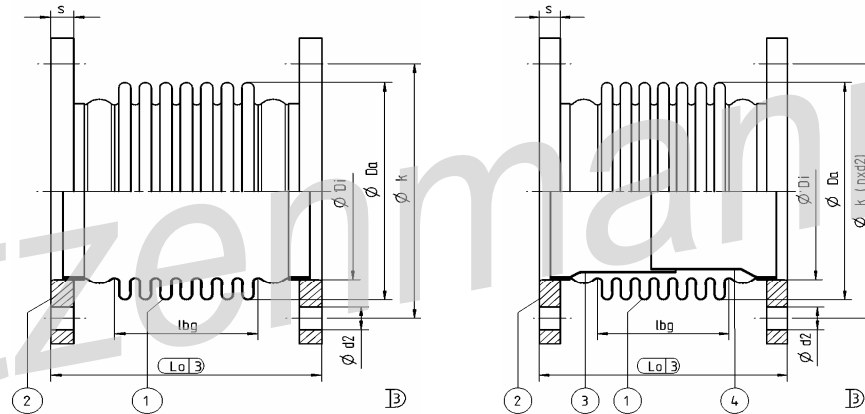


### PN 16

Nominal diameter	Nominal axial movement absorption	Type  AFN 16 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	22	.0050.022.	141	5	6	16	19	2,5	89	54	46	29	5,2	146	1,9	430	1,5
50	42	.0050.042.	230	6	7	16	19	2,4	91	143	47,2	42	26	153	2	66	1,3
65	28	.0065.028.	148	7	7	16	20	3	108	60	69,4	29	5,9	126	2,4	457	2,5
65	48	.0065.048.	220	8	8	16	20	3	110	132	70,9	40	22	136	2,7	103	2,5
80	23	.0080.023.	148	8	8	16	20	3,5	122	60	89,9	23	4,3	278	6,9	1302	7,3
80	50	.0080.050.	220	9	9	16	20	3,4	123	132	90,8	38	20	150	3,8	146	3,9
100	31	.0100.031.	155	10	10	16	22	4,2	150	65	139	24	5	227	8,8	1400	13
100	53	.0100.053.	230	12	12	16	22	4,1	152	140	141	36	18	196	7,7	264	10
125	21	.0125.021.	142	12	13	16	22	5,5	172	42	185	15	1,9	350	18	6932	31
125	42	.0125.042.	184	13	13	16	22	5,5	172	84	185	27	7,7	175	9	867	15
125	59	.0125.059.	244	15	15	16	22	5,3	174	144	187	34	18	200	10	338	16

## Axial expansion joints with plain fixed flanges

Type            **AFN 16...**

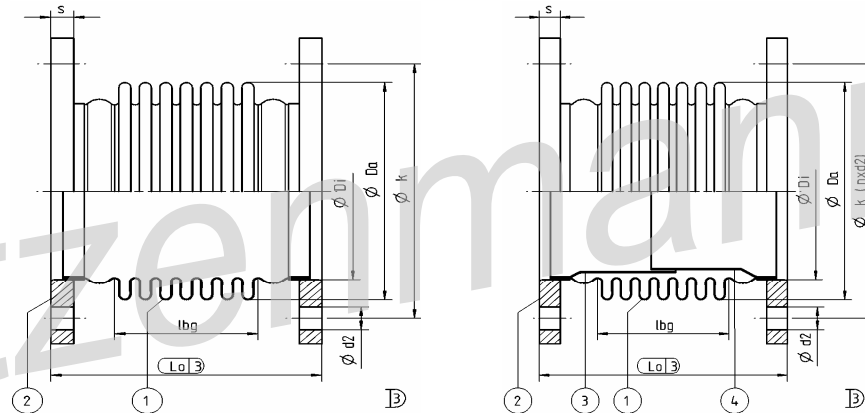


### PN 16

Nominal diameter	Nominal axial movement absorption	Type  AFN 16 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
150	24	.0150.024.	147	16	16	16	24	7,2	203	45	264	14	2	342	25	8455	52
150	48	.0150.048.	192	17	17	16	24	7,2	203	90	264	25	7,8	171	13	1054	26
150	66	.0150.066.	246	19	20	16	24	7	205	144	267	32	17	196	15	475	27
200	30	.0200.030.	158	22	23	16	26	9,6	260	54	441	14	2,3	514	63	14678	161
200	60	.0200.060.	212	24	26	16	26	9,6	260	108	441	26	9,1	257	31	1835	80
200	97	.0200.097.	374	33	35	16	26	9,4	262	270	445	29	37	276	34	316	40
250	32	.0250.032.	189	33	34	16	29	14,2	318	76	674	12	2,8	640	120	14135	179
250	56	.0250.056.	246	35	37	16	29	14,2	318	133	674	18	8,5	366	69	2635	102
250	103	.0250.103.	373	45	48	16	29	13,9	320	260	679	27	30	300	57	568	82
300	30	.0300.030.	182	43	45	16	32	18,9	374	63	940	9,6	1,8	940	246	42077	449
300	80	.0300.080.	287	50	53	16	32	18,9	374	168	940	21	13	352	92	2220	168
300	120	.0300.120.	464	70	76	16	32	18,3	376	345	946	25	40	327	86	489	143

## Axial expansion joints with plain fixed flanges

Type            AFN 16...



### PN 16

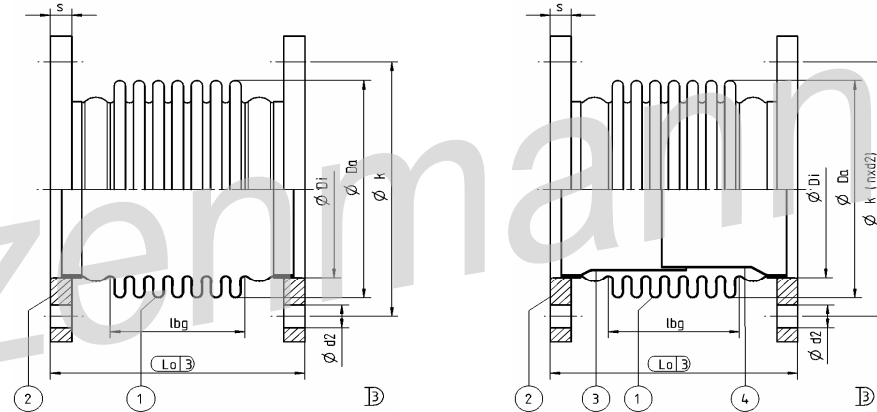
Nominal diameter	Nominal axial movement absorption	Type  AFN 16 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
350	30	.0350.030.	182	57	59	16	32	25,5	408	63	1128	8,8	1,7	920	288	49455	580
350	80	.0350.080.	287	65	69	16	32	25,5	408	168	1128	19	12	345	108	2611	217
350	130	.0350.130.	431	84	90	16	32	24,8	412	312	1140	26	35	334	106	736	205
400	48	.0400.048.	236	78	81	16	34	31,2	467	104	1476	12	3,8	946	388	24342	914
400	84	.0400.084.	314	87	92	16	34	31,2	467	182	1476	19	12	541	222	4544	522
400	132	.0400.132.	418	99	106	16	34	31,2	467	286	1476	25	29	344	141	1172	332
450	52	.0450.052.	242	98	101	16	37	39,6	520	104	1851	12	3,7	954	491	30826	1275
450	91	.0450.091.	320	108	114	16	37	39,6	520	182	1851	19	11	545	280	5753	729
450	143	.0450.143.	424	122	130	16	37	39,6	520	286	1851	24	28	347	178	1483	464
500	48	.0500.048.	224	121	124	16	38	51,8	576	84	2282	9,9	2,5	1128	715	68986	2169
500	96	.0500.096.	308	134	140	16	38	51,8	576	168	2282	18	10	564	357	8616	1085
500	144	.0500.144.	392	146	154	16	38	51,8	576	252	2282	24	22	376	238	2553	723

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with plain fixed flanges

Type            **AFN 25...**



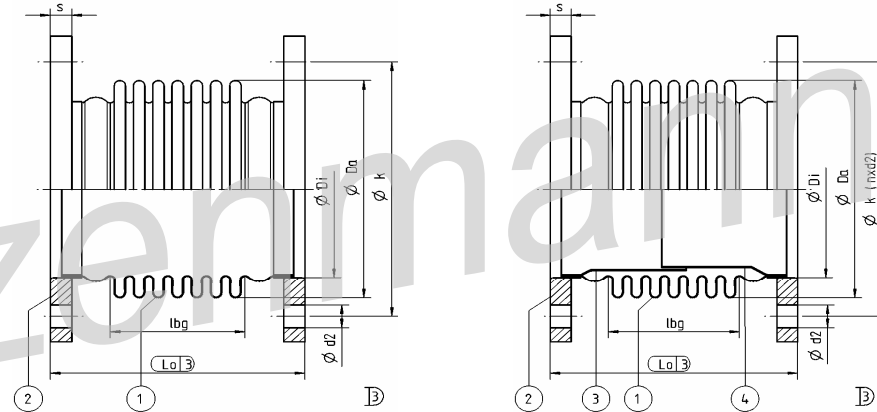
## PN 25

Nominal diameter	Nominal axial movement absorption	Type  AFN 25 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	13	.0050.013.	128	6	6	40	20	2,6	90	40	46,6	19	2,3	401	5,2	2173	3,6
50	28,8	.0050.029.	187	6	6	40	20	2,6	91	99	47,2	32	12	221	2,9	198	1,9
65	16,8	.0065.017.	134	7	7	40	22	3,3	109	44	70,1	19	2,6	340	6,6	2311	6,3
65	39,6	.0065.040.	222	9	9	40	22	3,2	111	132	71,6	33	18	218	4,3	166	3,6
80	22,5	.0080.023.	152	9	9	40	24	4	123	60	90,8	22	4,2	329	8,3	1555	8,6
80	42	.0080.042.	222	11	11	40	24	4	125	130	92,5	32	17	222	5,7	227	5,5
100	23,2	.0100.023.	144	12	12	40	24	5,3	151	52	140	18	3	340	13	3302	19
100	47,7	.0100.048.	218	14	14	40	24	5,3	152	126	141	30	15	218	8,5	361	11
125	26	.0125.026.	168	17	18	40	26	7,5	174	64	187	18	3,6	450	23	3864	36
125	52	.0125.052.	232	19	19	40	26	7,5	174	128	187	29	14	225	12	483	18
150	29,2	.0150.029.	166	21	22	40	28	9,4	205	64	267	17	3,4	440	33	5410	62
150	58,4	.0150.058.	230	23	24	40	28	9,4	205	128	267	27	14	220	16	676	31



## Axial expansion joints with plain fixed flanges

Type **AFN 25...**

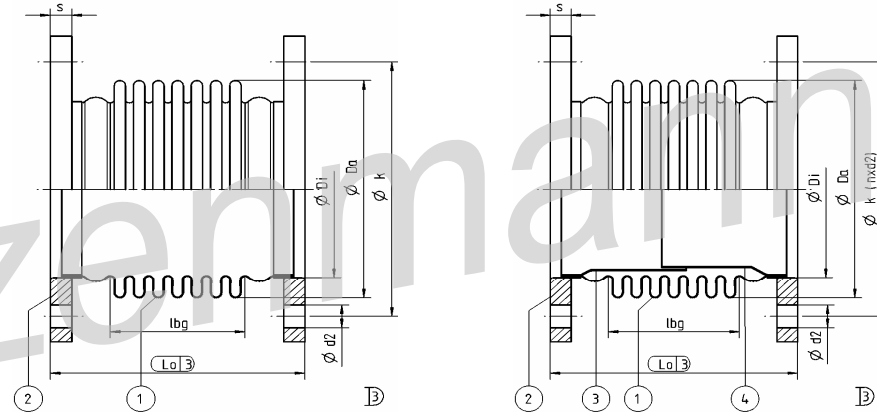


### PN 25

Nominal diameter	Nominal axial movement absorption	Type  AFN 25 ...	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	PN	s	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
200	26	.0200.026.	181	32	33	25	32	14,1	261	72	443	12	2,6	855	105	13759	124
200	45,5	.0200.046.	235	34	35	25	32	14,1	261	126	443	18	8	489	60	2569	71
200	70,95	.0200.071.	307	39	40	25	32	13,9	262	198	445	23	20	376	46	802	54
250	23,844	.0250.024.	185	45	46	25	35	19,7	320	60	679	9	1,6	1298	245	46135	353
250	47,688	.0250.048.	245	48	50	25	35	19,7	320	120	679	16	6,5	649	122	5762	177
250	79,48	.0250.079.	325	53	55	25	35	19,7	320	200	679	21	18	390	74	1245	106
300	27,444	.0300.027.	197	59	61	25	38	26,2	374	66	940	8,7	1,7	1200	313	48892	542
300	54,888	.0300.055.	263	64	66	25	38	26,2	374	132	940	16	7	600	157	6112	271
300	82,332	.0300.082.	329	68	72	25	38	26,2	374	198	940	19	16	400	104	1809	181
350	30	.0350.030.	211	92	94	25	42	40,6	412	72	1140	8,8	1,9	1445	458	59854	890
350	50	.0350.050.	259	96	99	25	42	40,6	412	120	1140	14	5,2	867	275	12928	534
350	80	.0350.080.	331	104	108	25	42	40,6	412	192	1140	19	13	542	172	3154	334

## Axial expansion joints with plain fixed flanges

Type            **AFN 25...**



### PN 25

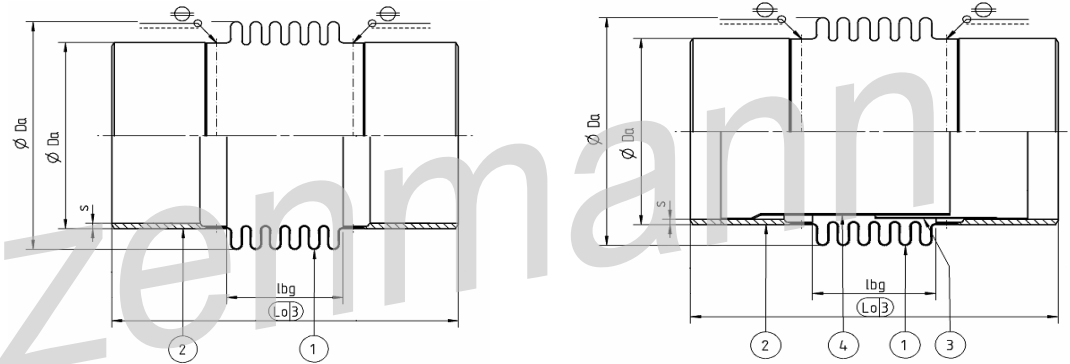
Nominal diameter	Nominal axial movement absorption	Type  <b>AFN 25 ...</b>	Overall length	Weight approx.		Flange			Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	PN	s	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
400	32	.0400.032.	248	114	117	25	42	48,9	466	100	1473	8,1	2,5	1934	791	53659	986
400	56	.0400.056.	323	124	128	25	42	48,9	466	175	1473	13	7,5	1105	452	10010	563
400	96	.0400.096.	472	148	155	25	42	48,9	469	324	1483	18	24	700	288	1859	369

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints for low pressure with weld ends

Type **ARG 01...**

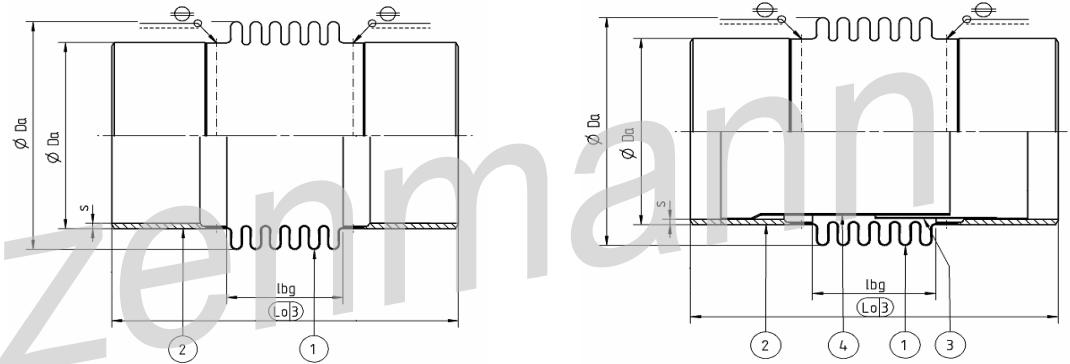


**PN 1**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARG 01 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
50	24	.0050.024.	214	1	1,2	60,3	4	80	0,4	89	54	46	36	5,6	0,3	87	1,1	259	350	1250	1
50	56	.0050.056.	286	1	2	60,3	4	80	0,4	89	126	46	50	31	0,3	37	0,5	20	150	230	0,4
50	80	.0050.080.	340	1	2	60,3	4	80	0,4	89	180	46	50	63	0,3	26	0,3	7	105	110	0,3
65	28	.0065.028.	214	2	2	76,1	4	80	0,6	107	54	68,7	33	5,3	0,3	85	1,6	378	290	1280	1,7
65	64	.0065.064.	286	2	2	76,1	4	80	0,6	107	126	68,7	50	29	0,3	36	0,7	30	125	235	0,7
65	92	.0065.092.	340	2	3	76,1	4	80	0,6	107	180	68,7	50	59	0,3	25	0,5	10	90	115	0,5
80	37	.0080.037.	230	2	2	88,9	4	80	0,7	121	70	89,1	39	8,1	0,3	67	1,7	233	220	840	2,1
80	74	.0080.074.	300	2	3	88,9	4	80	0,7	121	140	89,1	50	33	0,3	34	0,8	29	110	210	1,1
80	106	.0080.106.	360	2	3	88,9	4	80	0,7	121	200	89,1	50	66	0,3	24	0,6	9,8	75	105	0,7
100	40	.0100.040.	226	2	3	114,3	4	80	0,9	148	66	137	34	6,6	0,3	73	2,8	432	210	1050	4,4
100	86	.0100.086.	303	3	4	114,3	4	80	0,9	148	143	137	50	31	0,3	34	1,3	42	100	225	2
100	119	.0100.119.	358	3	4	114,3	4	80	0,9	148	198	137	50	59	0,3	24	0,9	16	70	115	1,5
125	63	.0125.063.	251	3	4	139,7	4	80	1,1	174	91	187	45	12	0,3	41	2,1	177	120	520	4,9
125	126	.0125.126.	342	4	5	139,7	4	80	1,1	174	182	187	50	49	0,3	21	1,1	23	60	130	2,5
125	180	.0125.180.	420	4	6	139,7	4	80	1,1	174	260	187	50	101	0,3	14	0,7	7,4	40	65	1,7

# Axial expansion joints for low pressure with weld ends

Type      ARG 01...

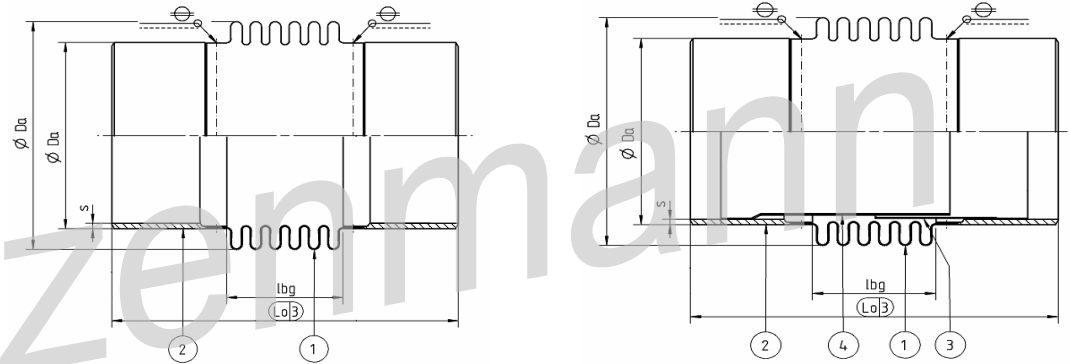


PN 1

Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	ARG 01 ...	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
150	63	.0150.063.	251	4	4	168,3	4	80	1,3	203	91	264	38	10	0,3	48	3,5	293	120	610	8,8
150	126	.0150.126.	342	4	6	168,3	4	80	1,3	203	182	264	50	42	0,3	24	1,8	37	60	150	4,4
150	180	.0150.180.	420	5	7	168,3	4	80	1,3	203	260	264	50	85	0,3	17	1,2	13	40	75	3,1
200	70	.0200.070.	265	5	6	219,1	4	80	1,7	255	105	432	33	10	0,3	53	6,4	397	110	600	18
200	140	.0200.140.	370	6	8	219,1	4	80	1,7	255	210	432	50	42	0,3	27	3,2	51	55	150	9,2
200	200	.0200.200.	460	7	9	219,1	4	80	1,7	255	300	432	50	85	0,3	19	2,3	17	40	75	6,4
250	72	.0250.072.	262	6	7	273	4	80	2,1	312	102	661	28	8,4	0,3	62	11	752	110	780	39
250	144	.0250.144.	364	7	9	273	4	80	2,1	312	204	661	50	34	0,3	31	5,7	94	55	190	19
250	216	.0250.216.	466	8	12	273	4	80	2,1	312	306	661	50	76	0,3	21	3,9	28	35	90	13
300	70	.0300.070.	255	7	9	323,9	4	80	2,5	365	95	916	23	6,5	0,3	73	19	1415	110	1030	72
300	154	.0300.154.	369	8	13	323,9	4	80	2,5	365	209	916	46	31	0,3	33	8,4	132	50	210	33
300	210	.0300.210.	445	9	15	323,9	4	80	2,5	365	285	916	50	58	0,3	24	6,1	52	40	115	24
350	75	.0350.075.	260	7	10	355,6	4	80	2,8	400	100	1104	22	6,7	0,3	66	20	1392	100	950	90
350	150	.0350.150.	360	9	14	355,6	4	80	2,8	400	200	1104	41	27	0,3	33	10	174	50	240	45
350	210	.0350.210.	440	10	16	355,6	4	80	2,8	400	280	1104	50	52	0,3	24	7,4	62	35	120	32

## Axial expansion joints for low pressure with weld ends

Type      **ARG 01...**

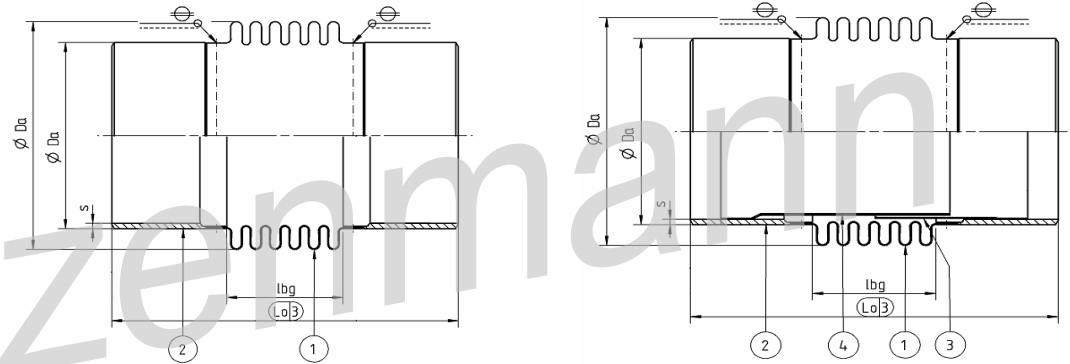


**PN 1**

Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	ARG 01 ...	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
400	65	.0400.065.	265	10	13	406,4	4	80	3,2	458	105	1445	17	5,3	0,3	212	85	5283	120	1260	199
400	117	.0400.117.	349	13	18	406,4	4	80	3,2	458	189	1445	30	17	0,3	118	47	904	70	390	110
400	195	.0400.195.	475	17	25	406,4	4	80	3,2	458	315	1445	45	48	0,3	71	29	195	40	140	66
450	56	.0450.056.	248	11	14	457	4	80	3,6	513	88	1825	13	3,4	0,3	243	123	10935	130	1850	333
450	140	.0450.140.	380	16	22	457	4	80	3,6	513	220	1825	31	21	0,3	97	49	698	55	300	133
450	196	.0450.196.	468	19	27	457	4	80	3,6	513	308	1825	41	42	0,3	70	35	253	40	150	95
500	68	.0500.068.	292	14	18	508	4	100	4,9	569	92	2252	14	3,9	0,3	215	135	10875	115	1690	427
500	136	.0500.136.	384	18	25	508	4	100	4,9	569	184	2252	28	16	0,3	107	67	1359	55	420	213
500	221	.0500.221.	499	23	33	508	4	100	4,9	569	299	2252	42	41	0,3	66	41	318	35	160	131
600	76	.0600.076.	304	17	22	610	4	100	5,9	674	104	3202	14	4,1	0,3	215	191	12099	100	1570	689
600	152	.0600.152.	408	22	32	610	4	100	5,9	674	208	3202	26	17	0,3	107	95	1512	50	390	345
600	228	.0600.228.	512	27	40	610	4	100	5,9	674	312	3202	36	37	0,3	72	64	446	35	175	230
700	80	.0700.080.	312	21	27	711	4	100	6,9	780	112	4324	12	4	0,3	203	244	13365	90	1480	1022
700	140	.0700.140.	396	26	36	711	4	100	6,9	780	196	4324	21	12	0,3	116	139	2494	50	480	584
700	220	.0700.220.	508	32	46	711	4	100	6,9	780	308	4324	30	30	0,3	74	89	644	30	195	372

# Axial expansion joints for low pressure with weld ends

Type      ARG 01...

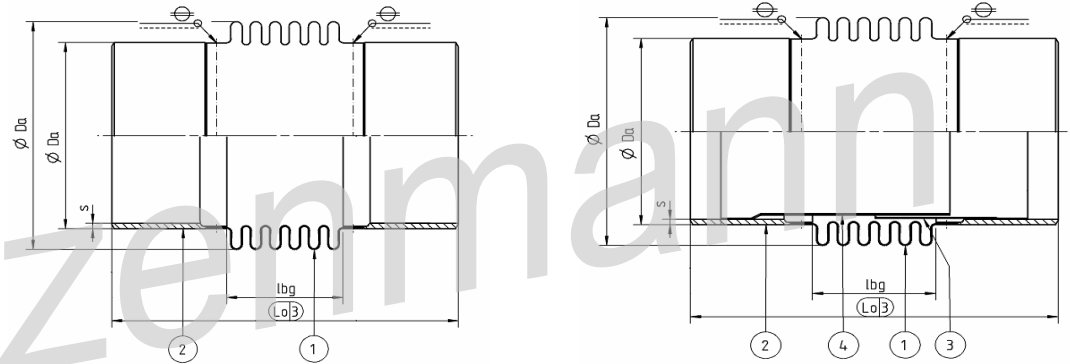


PN 1

Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	ARG 01 ...	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
800	84	.0800.084.	316	24	33	813	4	100	7,9	882	116	5588	11	3,9	0,3	220	341	17449	85	1570	1502
800	147	.0800.147.	403	29	42	813	4	100	7,9	882	203	5588	19	12	0,3	126	196	3263	50	510	858
800	231	.0800.231.	519	37	54	813	4	100	7,9	882	319	5588	28	29	0,3	80	124	839	30	210	546
900	84	.0900.084.	320	27	38	914	4	100	8,9	992	120	7133	9,9	3,5	0,3	238	472	22421	80	1650	2161
900	168	.0900.168.	440	36	52	914	4	100	8,9	992	240	7133	19	14	0,3	119	236	2815	40	410	1081
900	231	.0900.231.	530	43	62	914	4	100	8,9	992	330	7133	25	27	0,3	86	170	1076	30	220	786
1000	72	.1000.072.	296	28	36	1016	4	100	9,9	1095	96	8750	7,7	2,2	0,3	335	814	60745	105	2940	3869
1000	144	.1000.144.	392	35	51	1016	4	100	9,9	1095	192	8750	15	8,7	0,3	168	408	7570	50	740	1935
1000	240	.1000.240.	520	45	67	1016	4	100	9,9	1095	320	8750	23	24	0,3	101	245	1632	30	265	1161
1200	72	.1200.072.	293	34	46	1220	4	100	11,9	1295	93	12331	6,5	1,8	0,3	331	1134	89855	95	3210	6261
1200	144	.1200.144.	386	43	67	1220	4	100	11,9	1295	186	12331	13	7,1	0,3	165	565	11232	45	800	3130
1200	240	.1200.240.	510	55	89	1220	4	100	11,9	1295	310	12331	20	20	0,3	99	339	2426	30	290	1878
1400	48	.1400.048.	304	39	53	1420	4	100	13,9	1472	104	16377	3,8	1,2	0,3	932	4190	266329	150	5320	10825
1400	108	.1400.108.	434	51	80	1420	4	100	13,9	1472	234	16377	8,3	5,8	0,3	414	1865	23362	70	1050	4811
1400	180	.1400.180.	590	65	109	1420	4	100	13,9	1472	390	16377	13	16	0,3	249	1119	5038	40	380	2887

## Axial expansion joints for low pressure with weld ends

Type **ARG 01...**

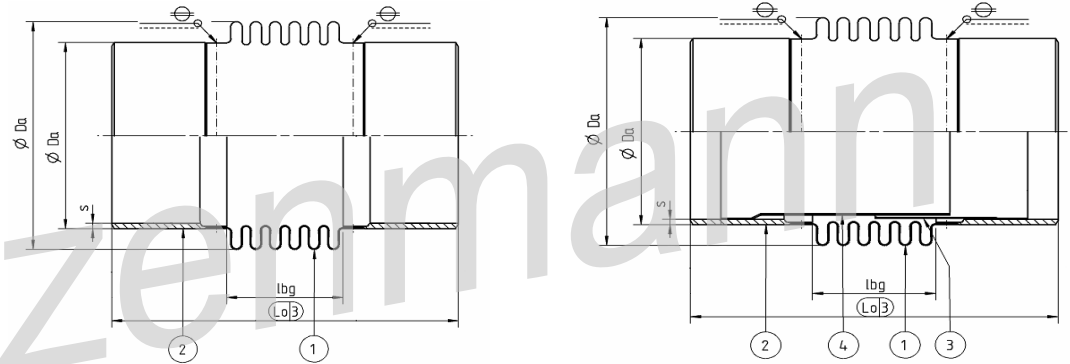


**PN 1**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARG 01 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
1600	48	.1600.048.	304	44	60	1620	4	100	15,8	1672	104	21227	3,3	1	0,3	1056	6168	391692	150	6040	16099
1600	108	.1600.108.	434	58	92	1620	4	100	15,8	1672	234	21227	7,3	5,1	0,3	470	2742	34354	70	1200	7155
1600	180	.1600.180.	590	74	124	1620	4	100	15,8	1672	390	21227	12	14	0,3	282	1645	7437	40	430	4293
1800	48	.1800.048.	304	49	68	1820	4	100	17,8	1872	104	26706	3	0,9	0	1180	8672	550794	150	6760	22856
1800	108	.1800.108.	434	65	103	1820	4	100	17,8	1872	234	26706	6,6	4,6	0,3	524	3858	48345	70	1340	10158
1800	180	.1800.180.	590	84	140	1820	4	100	17,8	1872	390	26706	10	13	0,3	315	2315	10463	40	480	6095
2000	48	.2000.048.	304	55	76	2020	4	100	19,8	2072	104	32813	2,7	0,8	0,3	1302	11767	747440	150	7480	31280
2000	108	.2000.108.	434	72	115	2020	4	100	19,8	2072	234	32813	5,9	4,1	0,3	579	5232	65695	70	1480	13902
2000	180	.2000.180.	590	93	155	2020	4	100	19,8	2072	390	32813	9,5	11	0,3	347	3136	14174	40	530	8341
2200	48	.2200.048.	304	82	105	2220	6	100	32,6	2272	104	39549	2,5	0,7	0,3	1424	15523	986064	150	8200	41554
2200	108	.2200.108.	434	101	149	2220	6	100	32,6	2272	234	39549	5,4	3,8	0,3	633	6899	86629	70	1620	18469
2200	180	.2200.180.	590	124	193	2220	6	100	32,6	2272	390	39549	8,8	10	0,3	380	4142	18722	40	580	11081
2400	48	.2400.048.	304	89	114	2420	6	100	35,5	2472	104	46913	2,3	0,7	0,3	1545	20003	1270727	150	8900	53864
2400	108	.2400.108.	434	110	163	2420	6	100	35,5	2472	234	46913	5	3,4	0,3	687	8887	111595	70	1760	23939
2400	180	.2400.180.	590	135	211	2420	6	100	35,5	2472	390	46913	8	9,6	0,3	412	5330	24093	40	630	14364

## Axial expansion joints for low pressure with weld ends

Type **ARG 01...**



**PN 1**

Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		universal vibration	Spring rates at 20°C per bellows			natural frequency of bellows		Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>		axial	angular	lateral	axial	lateral	
DN	2δ <sub>N</sub>	ARG 01 ...	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	â	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	ω <sub>x</sub>	ω <sub>y</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	mm	N/mm	Nm/deg	N/mm	Hz	Hz	kNm/deg
2600	48	.2600.048.	304	97	124	2620	6	100	38,4	2672	104	54905	2,1	0,6	0,3	1667	25256	1604521	150	9620	68391
2600	108	.2600.108.	434	119	176	2620	6	100	38,4	2672	234	54905	4,6	3,2	0,3	741	11225	140948	70	1900	30396
2600	180	.2600.180.	590	146	228	2620	6	100	38,4	2672	390	54905	7,4	8,9	0,3	444	6741	30403	40	680	18238
2800	48	.2800.048.	304	104	133	2820	6	100	41,4	2872	104	63526	1,9	0,6	0,3	1788	31375	1993293	150	10330	85321
2800	108	.2800.108.	434	128	190	2820	6	100	41,4	2872	234	63526	4,3	3	0,3	795	13940	175043	65	2040	37921
2800	180	.2800.180.	590	157	246	2820	6	100	41,4	2872	390	63526	7	8,2	0,3	477	8364	37809	40	740	22752
3000	48	.3000.048.	304	111	143	3020	6	100	44,3	3072	104	72774	1,8	0,5	0,3	1909	38389	2438990	150	11050	104837
3000	108	.3000.108.	434	137	203	3020	6	100	44,3	3072	234	72774	4	2,8	0,3	849	17062	213982	65	2180	46594
3000	180	.3000.180.	590	169	263	3020	6	100	44,3	3072	390	72774	6,5	7,7	0,3	509	10229	46238	40	790	27957

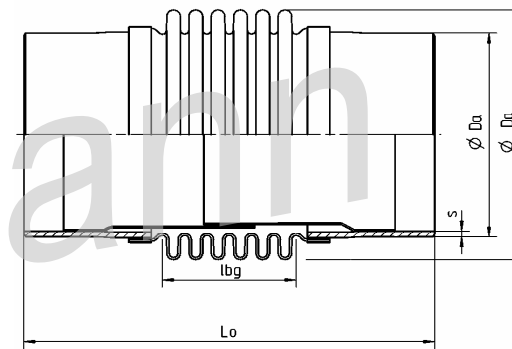
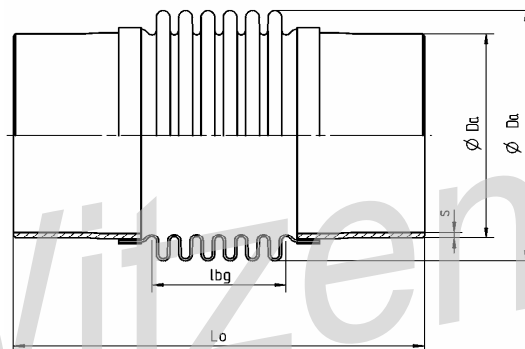
1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.



## Axial expansion joints with weld ends

Type            **ARN 02...**

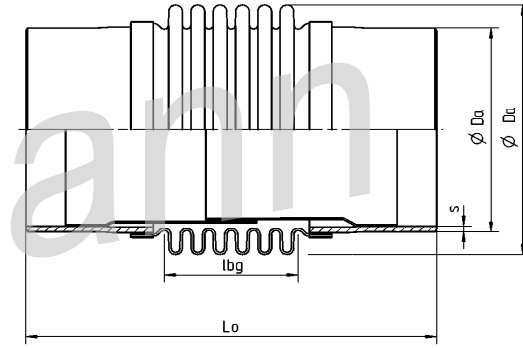
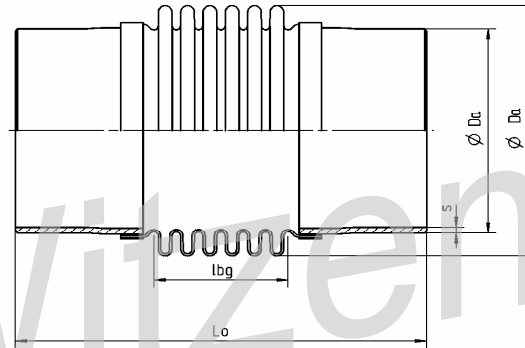


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 02 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	$2\delta_N$	-	$Lo$	G	G	$Da$	s	L	G	$Da$	lb	$Ae$	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	24	.0050.024.	214	1	1,2	60,3	4	80	0,4	89	54	46	35	5,6	87	1,1	259	1
50	44	.0050.044.	259	1	1	60,3	4	80	0,4	89	99	46	50	19	48	0,6	42	0,5
50	70	.0050.070.	331	2	2	60,3	4	80	0,4	89	171	46	50	52	46	0,6	14	0,5
65	28	.0065.028.	214	2	2	76,1	4	80	0,6	107	54	68,7	33	5,3	85	1,6	378	1,7
65	60	.0065.060.	277	2	2	76,1	4	80	0,6	107	117	68,7	50	25	39	0,7	37	0,8
65	87	.0065.087.	350	2	3	76,1	4	80	0,6	108	190	69,4	50	59	40	0,8	14	0,8
80	27	.0080.027.	210	2	2	88,9	4	80	0,7	121	50	89,1	28	4,1	94	2,3	640	2,9
80	64	.0080.064.	280	2	2	88,9	4	80	0,7	121	120	89,1	50	24	39	1	46	1,2
80	92	.0080.092.	358	3	3	88,9	4	80	0,7	121	198	89,1	50	57	43	1,1	18	1,2
100	46	.0100.046.	237	2	3	114,3	4	80	0,9	148	77	137	38	9	63	2,4	273	3,8
100	86	.0100.086.	303	3	4	114,3	4	80	0,9	148	143	137	50	31	34	1,3	42	2
100	122	.0100.122.	420	5	7	114,3	4	80	0,9	150	260	139	50	79	57	2,2	22	3,2

## Axial expansion joints with weld ends

Type            **ARN 02...**

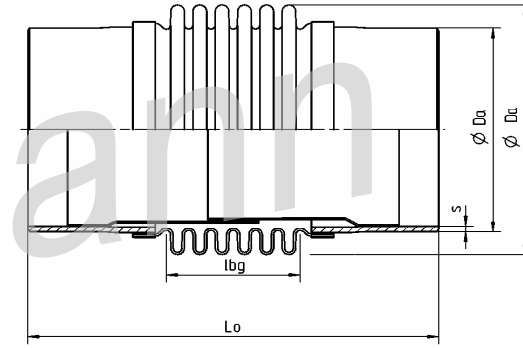
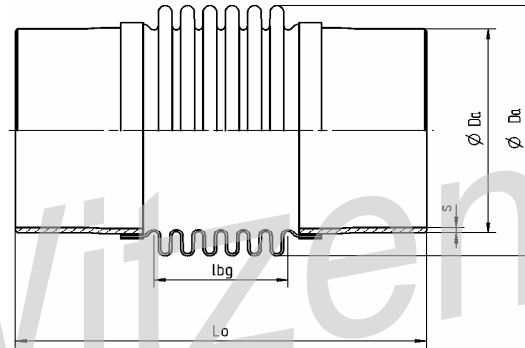


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 02 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
125	45	.0125.045.	241	3	3	139,7	4	80	1,1	174	65	187	32	6,3	58	3	492	6,9
125	90	.0125.090.	306	3	4	139,7	4	80	1,1	174	130	187	50	25	29	1,5	61	3,4
125	140	.0125.140.	456	7	8	139,7	4	80	1,1	172	280	185	50	85	53	2,7	23	4,6
150	54	.0150.054.	254	4	4	168,3	4,5	80	1,4	203	78	264	32	7,7	56	4,1	465	10
150	99	.0150.099.	319	4	5	168,3	4,5	80	1,4	203	143	264	50	26	31	2,3	77	5,6
150	160	.0150.160.	476	9	11	168,3	4,5	80	1,4	203	300	264	50	87	51	3,7	29	7,8
200	70	.0200.070.	285	6	8	219,1	6,3	80	2,6	255	105	432	32	10	53	6,4	397	18
200	130	.0200.130.	388	9	11	219,1	6,3	80	2,6	256	208	434	50	38	43	5,2	80	15
200	190	.0200.190.	503	13	16	219,1	6,3	80	2,6	257	323	436	50	87	51	6,2	41	16
250	72	.0250.072.	282	9	11	273	7,1	80	3,7	312	102	661	27	8,4	62	11	752	39
250	144	.0250.144.	384	12	14	273	7,1	80	3,7	315	204	667	47	34	40	7,4	123	28
250	204	.0250.204.	486	17	21	273	7,1	80	3,7	316	306	670	50	71	50	9,3	67	32

## Axial expansion joints with weld ends

Type            **ARN 02...**

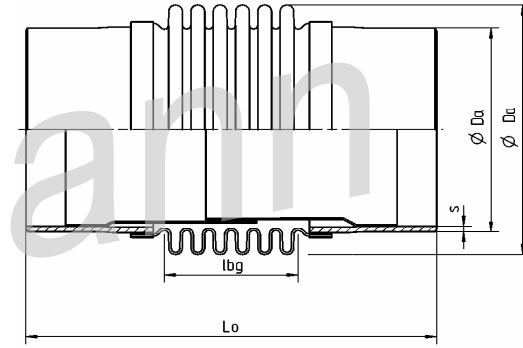
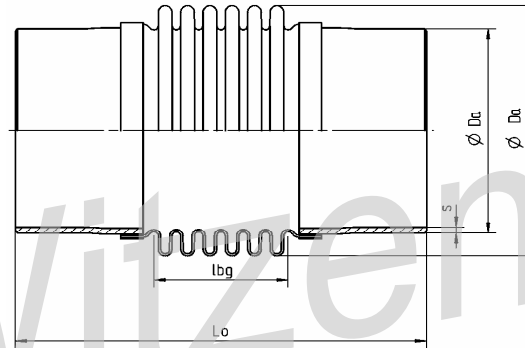


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 02 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thickness	length	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
300	70	.0300.070.	279	12	14	323,9	8	80	5	365	95	916	22	6,5	73	19	1415	72
300	126	.0300.126.	355	13	17	323,9	8	80	5	365	171	916	36	21	40	10	239	40
300	210	.0300.210.	464	21	26	323,9	8	80	5	371	280	932	50	57	52	13	118	59
350	75	.0350.075.	284	10	13	355,6	6	80	4,1	400	100	1104	22	6,7	66	20	1392	90
350	150	.0350.150.	384	13	18	355,6	6	80	4,1	402	200	1110	39	27	46	14	244	66
350	210	.0350.210.	478	20	26	355,6	6	80	4,1	402	294	1110	50	55	60	19	147	79
400	65	.0400.065.	289	13	16	406,4	6	80	4,7	458	105	1445	17	5,3	212	85	5283	199
400	117	.0400.117.	373	16	21	406,4	6	80	4,7	458	189	1445	28	17	118	47	904	110
400	195	.0400.195.	499	20	28	406,4	6	80	4,7	458	315	1445	39	48	71	29	195	66

## Axial expansion joints with weld ends

Type            **ARN 02...**

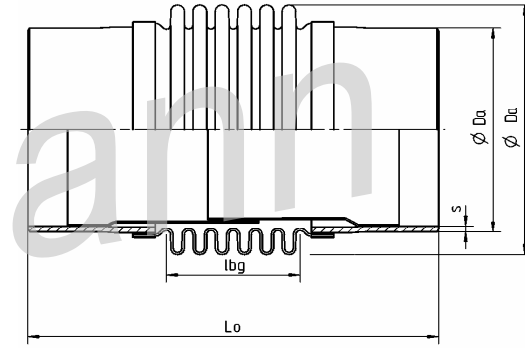
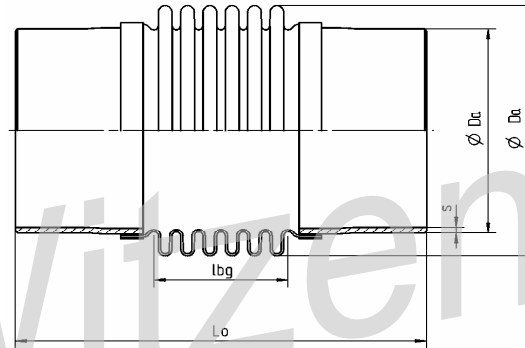


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 02 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	L <sub>o</sub>	G	G	Da	s	L	G	Da	lb	A <sub>e</sub>	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
450	56	.0450.056.	272	14	18	457	6	80	5,3	513	88	1825	13	3,4	243	123	10935	333
450	140	.0450.140.	404	19	26	457	6	80	5,3	513	220	1825	29	21	97	49	698	133
450	196	.0450.196.	492	23	31	457	6	80	5,3	513	308	1825	36	42	70	35	253	95
500	68	.0500.068.	320	19	23	508	6	100	7,4	569	92	2252	14	3,9	215	135	10875	427
500	136	.0500.136.	412	23	31	508	6	100	7,4	569	184	2252	26	16	107	67	1359	213
500	221	.0500.221.	527	28	39	508	6	100	7,4	569	299	2252	37	41	66	41	318	131
600	76	.0600.076.	332	23	29	610	6	100	8,9	674	104	3202	13	4,1	215	191	12099	689
600	152	.0600.152.	436	28	38	610	6	100	8,9	674	208	3202	25	17	107	95	1512	345
600	228	.0600.228.	540	33	47	610	6	100	8,9	674	312	3202	32	37	72	64	446	230
700	80	.0700.080.	340	28	34	711	6	100	10,4	780	112	4324	12	4	203	244	13365	1022
700	140	.0700.140.	424	33	44	711	6	100	10,4	780	196	4324	20	12	116	139	2494	584
700	220	.0700.220.	536	39	54	711	6	100	10,4	780	308	4324	27	30	74	89	644	372

## Axial expansion joints with weld ends

Type            **ARN 02...**

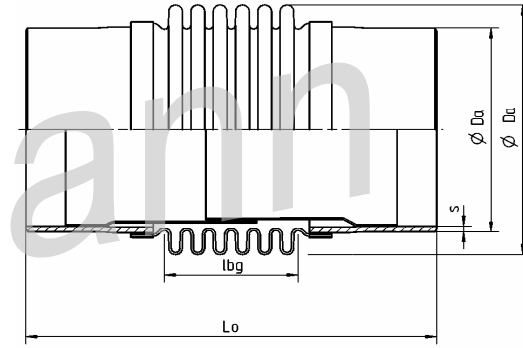
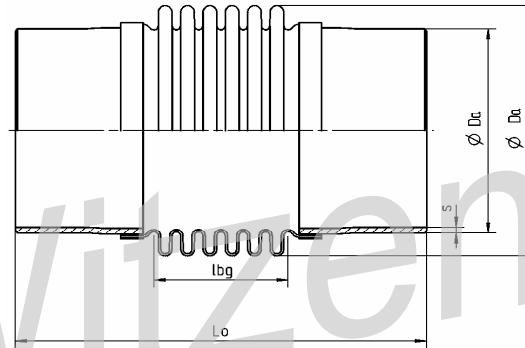


**PN 2,5**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 02 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles		axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
800	84	.0800.084.	348	32	42	813	6	100	11,9	882	116	5588	11	3,9	220	341	17449	1502
800	147	.0800.147.	435	37	51	813	6	100	11,9	882	203	5588	18	12	126	196	3263	858
800	231	.0800.231.	551	45	63	813	6	100	11,9	882	319	5588	25	29	80	124	839	546
900	84	.0900.084.	352	36	48	914	6	100	13,4	992	120	7133	9,8	3,5	238	472	22421	2161
900	168	.0900.168.	472	45	62	914	6	100	13,4	992	240	7133	18	14	119	236	2815	1081
900	231	.0900.231.	562	51	72	914	6	100	13,4	992	330	7133	22	27	86	170	1076	786
1000	72	.1000.072.	332	38	47	1016	6	100	14,8	1095	96	8750	7,7	2,2	335	814	60745	3869
1000	144	.1000.144.	428	45	62	1016	6	100	14,8	1095	192	8750	14	8,7	168	408	7570	1935
1000	240	.1000.240.	556	55	78	1016	6	100	14,8	1095	320	8750	21	24	101	245	1632	1161
1200	72	.1200.072.	332	62	77	1220	8	100	23,8	1295	96	12331	6,5	1,8	511	1750	130579	9432
1200	144	.1200.144.	428	76	103	1220	8	100	23,8	1295	192	12331	13	7,4	256	877	16290	4716
1200	240	.1200.240.	556	94	131	1220	8	100	23,8	1295	320	12331	19	20	153	524	3519	2830

## Axial expansion joints with weld ends

Type            **ARN 02...**



**PN 2,5**

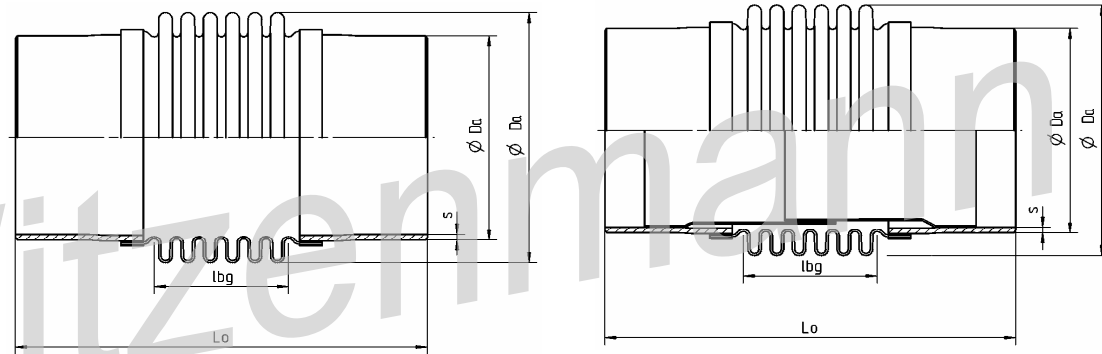
Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 02 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup>		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	nominal at 1000 cycles	angular <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
1400	48	.1400.048.	304	66	81	1420	8	100	27,7	1472	104	16377	3,8	1,2	932	4190	266329	10825
1400	108	.1400.108.	434	78	108	1420	8	100	27,7	1472	234	16377	8,1	5,8	414	1865	23362	4811
1400	180	.1400.180.	590	93	136	1420	8	100	27,7	1472	390	16377	12	16	249	1119	5038	2887
1600	48	.1600.048.	304	75	92	1620	8	100	31,6	1672	104	21227	3,3	1	1056	6168	391692	16099
1600	108	.1600.108.	434	89	123	1620	8	100	31,6	1672	234	21227	7,2	5,1	470	2742	34354	7155
1600	180	.1600.180.	590	106	156	1620	8	100	31,6	1672	390	21227	11	14	282	1645	7437	4293
1800	48	.1800.048.	304	85	103	1820	8	100	35,5	1872	104	26706	3	0,9	1180	8672	550794	22856
1800	108	.1800.108.	434	100	139	1820	8	100	35,5	1872	234	26706	6,4	4,6	524	3858	48345	10158
1800	180	.1800.180.	590	119	175	1820	8	100	35,5	1872	390	26706	9,8	13	315	2315	10463	6095
2000	48	.2000.048.	304	94	115	2020	8	100	39,4	2072	104	32813	2,7	0,8	1302	11767	747440	31280
2000	108	.2000.108.	434	111	154	2020	8	100	39,4	2072	234	32813	5,8	4,1	579	5232	65695	13902
2000	180	.2000.180.	590	132	194	2020	8	100	39,4	2072	390	32813	9	11	347	3136	14174	8341

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with weld ends

Type            **ARN 06...**

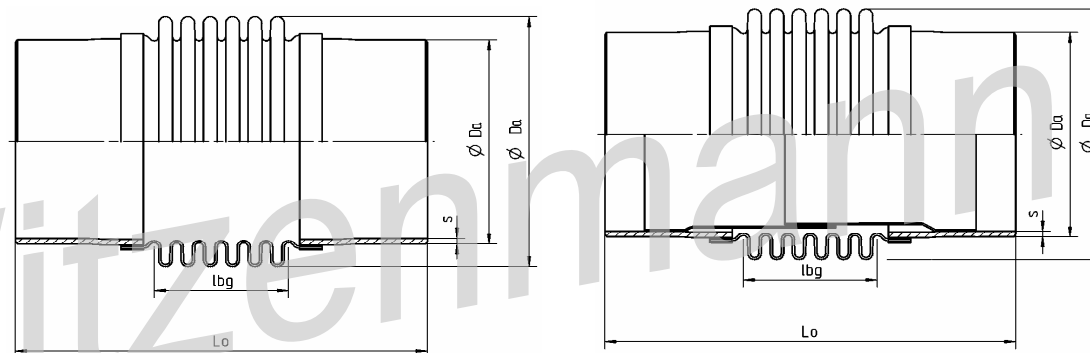


**PN 6**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 06 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	24	.0050.024.	214	1	1	60,3	4	80	0,4	89	54	46	33	5,6	87	1,1	259	1
50	52	.0050.052.	286	1,4	1,7	60,3	4	80	0,4	89	126	46	50	28	62	0,8	34	0,6
65	28	.0065.028.	214	1,5	1,7	76,1	4	80	0,6	107	54	68,7	31	5,3	85	1,6	378	1,7
65	46	.0065.046.	250	1,6	1,9	76,1	4	80	0,6	107	90	68,7	44	15	51	1	81	1
65	72	.0065.072.	358	3,6	4,2	76,1	4	80	0,6	110	198	70,9	50	50	91	1,8	30	1,7
80	27	.0080.027.	210	1,7	2	88,9	4	80	0,7	121	50	89,1	27	4,1	94	2,3	640	2,9
80	48	.0080.048.	250	1,9	2,2	88,9	4	80	0,7	121	90	89,1	41	13	52	1,3	109	1,6
80	77	.0080.077.	364	4	4,7	88,9	4	80	0,7	123	204	90,8	50	48	97	2,4	40	2,5
100	33	.0100.033.	215	2,2	2,6	114,3	4	80	0,9	148	55	137	27	4,6	88	3,3	752	5,3
100	59	.0100.059.	268	2,8	3,3	114,3	4	80	0,9	149	108	138	43	16	71	2,7	160	4,3
100	93	.0100.093.	368	5	6	114,3	4	80	0,9	151	208	140	50	48	85	3,3	52	4,8
125	36	.0125.036.	228	2,6	3,1	139,7	4	80	1,1	174	52	187	25	4	72	3,7	953	8,6
125	63	.0125.063.	267	2,9	3,6	139,7	4	80	1,1	174	91	187	39	12	41	2,1	177	4,9
125	98	.0125.098.	386	6	7	139,7	4	80	1,1	173	210	186	50	45	89	4,6	71	7,8

## Axial expansion joints with weld ends

Type            **ARN 06...**



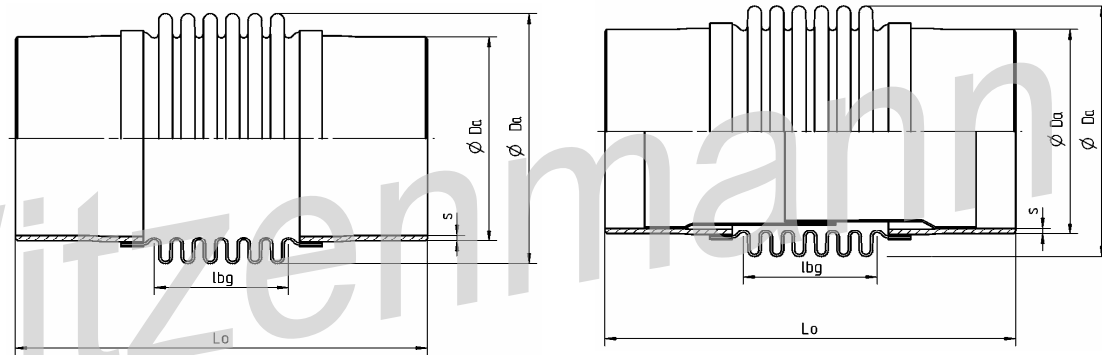
**PN 6**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 06 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
150	40	.0150.040.	246	3,7	4,4	168,3	4,5	80	1,4	202	70	263	23	5,1	117	8,5	1189	19
150	88	.0150.088.	341	6	8	168,3	4,5	80	1,4	203	165	264	45	26	93	6,8	171	14
150	124	.0150.124.	448	11	13	168,3	4,5	80	1,4	205	272	267	50	61	104	7,7	70	14
200	40	.0200.040.	244	6	7	219,1	6,3	80	2,6	256	64	434	19	3,6	138	17	2791	47
200	90	.0200.090.	333	9	11	219,1	6,3	80	2,6	257	153	436	37	19	108	13	380	35
200	140	.0200.140.	432	15	18	219,1	6,3	80	2,6	260	252	441	50	50	110	13	145	34
250	48	.0250.048.	252	10	11	273	7,1	80	3,7	316	72	670	18	3,9	211	39	5156	138
250	96	.0250.096.	324	12	14	273	7,1	80	3,7	316	144	670	32	16	105	20	648	69
250	144	.0250.144.	420	19	22	273	7,1	80	3,7	319	240	677	45	39	110	21	245	70
300	60	.0300.060.	264	13	16	323,9	8	80	5	371	80	932	19	4,6	183	47	5062	207
300	120	.0300.120.	344	16	20	323,9	8	80	5	371	160	932	34	19	92	24	633	104
300	165	.0300.165.	426	24	29	323,9	8	80	5	374	242	940	44	38	104	27	319	116



## Axial expansion joints with weld ends

Type            **ARN 06...**

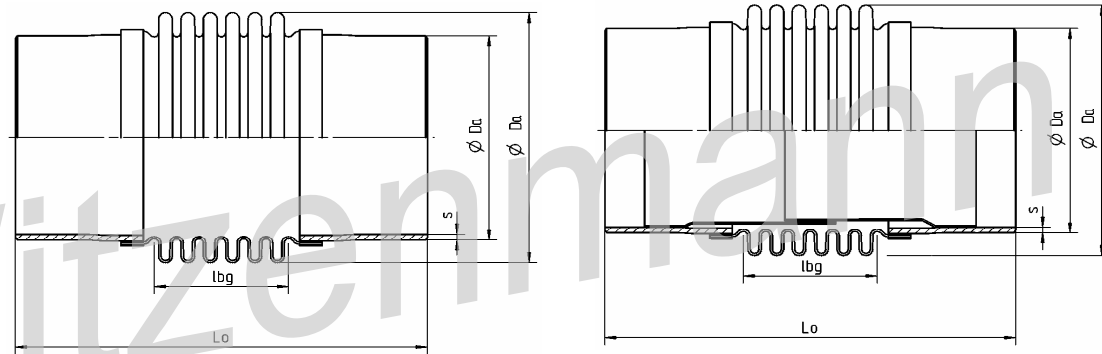


**PN 6**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 06 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
350	60	.0350.060.	268	12	14	355,6	6	80	4,1	402	84	1110	18	4,5	212	65	6311	278
350	120	.0350.120.	352	15	20	355,6	6	80	4,1	402	168	1110	31	18	106	33	789	139
350	165	.0350.165.	437	24	29	355,6	6	80	4,1	405	253	1119	40	37	120	37	397	156
400	52	.0400.052.	272	14	17	406,4	6	80	4,7	461	88	1456	13	3,5	361	146	12887	359
400	117	.0400.117.	382	19	25	406,4	6	80	4,7	461	198	1456	25	18	160	65	1135	159
400	169	.0400.169.	483	29	36	406,4	6	80	4,7	462	299	1459	32	39	148	60	461	146
450	56	.0450.056.	276	16	19	457	6	80	5,3	514	92	1828	13	3,6	366	186	15018	496
450	112	.0450.112.	368	21	27	457	6	80	5,3	514	184	1828	22	14	183	93	1877	248
450	182	.0450.182.	496	33	42	457	6	80	5,3	515	312	1832	30	39	150	76	539	202
500	66	.0500.066.	328	24	28	508	6	100	7,4	572	100	2265	14	4,1	414	260	17778	831
500	149	.0500.149.	453	34	42	508	6	100	7,4	572	225	2265	26	21	184	116	1564	369
500	215	.0500.215.	579	56	68	508	6	100	7,4	574	351	2273	35	47	192	121	673	378

## Axial expansion joints with weld ends

Type            **ARN 06...**

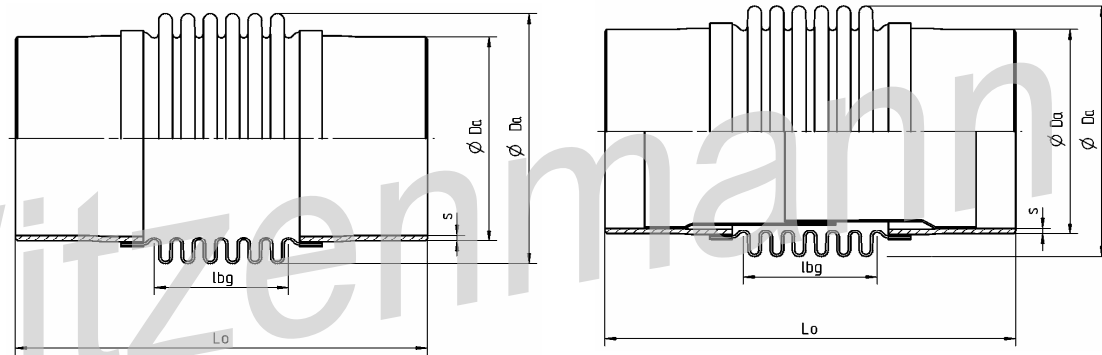


**PN 6**

Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 06 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
600	76	.0600.076.	340	29	35	610	6	100	8,9	677	112	3217	13	4,4	414	370	20180	1344
600	133	.0600.133.	424	37	47	610	6	100	8,9	677	196	3217	21	14	237	212	3774	768
600	216	.0600.216.	576	66	80	610	6	100	8,9	678	348	3222	30	39	216	193	1092	676
700	80	.0700.080.	340	41	48	711	8	100	13,8	780	112	4324	12	4	439	527	28770	2091
700	140	.0700.140.	424	51	62	711	8	100	13,8	780	196	4324	19	12	251	301	5374	1195
700	220	.0700.220.	558	82	98	711	8	100	13,8	783	330	4342	27	33	232	280	1751	1113
800	84	.0800.084.	364	57	67	813	8	100	15,8	887	132	5621	11	4,4	642	1002	39372	4350
800	168	.0800.168.	496	80	96	813	8	100	15,8	887	264	5621	20	17	321	501	4914	2175
800	231	.0800.231.	595	97	117	813	8	100	15,8	887	363	5621	24	33	233	364	1890	1582

## Axial expansion joints with weld ends

Type            **ARN 06...**



**PN 6**

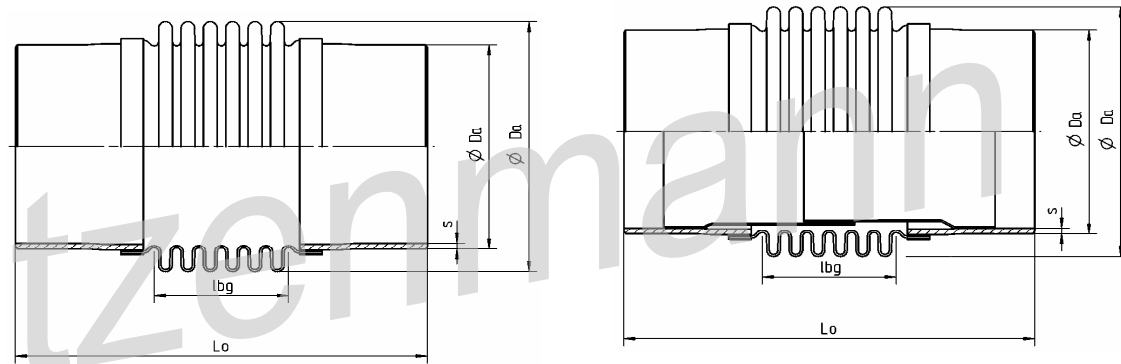
Nominal diameter	Nominal axial movement absorption	Type  <b>ARN 06 ...</b>	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
900	84	.0900.084.	364	64	76	914	8	100	17,8	996	132	7163	9,8	3,9	715	1423	55902	6367
900	168	.0900.168.	496	91	109	914	8	100	17,8	996	264	7163	18	15	357	710	6988	3183
900	231	.0900.231.	595	111	133	914	8	100	17,8	996	363	7163	21	29	260	517	2689	2315
1000	66	.1000.066.	341	64	74	1016	8	100	19,8	1100	105	8791	7	2,2	974	2379	147726	11286
1000	132	.1000.132.	446	87	104	1016	8	100	19,8	1100	210	8791	13	8,7	487	1189	18466	5643
1000	220	.1000.220.	586	117	141	1016	8	100	19,8	1100	350	8791	19	24	292	713	3989	3386
1200	69	.1200.069.	341	89	104	1220	10	100	29,7	1296	105	12341	6,2	1,9	1092	3743	232590	18919
1200	138	.1200.138.	446	116	144	1220	10	100	29,7	1296	210	12341	12	7,7	546	1872	29074	9459
1200	230	.1200.230.	586	153	191	1220	10	100	29,7	1296	350	12341	17	21	328	1124	6291	5676

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with weld ends

Type            **ARN 10...**

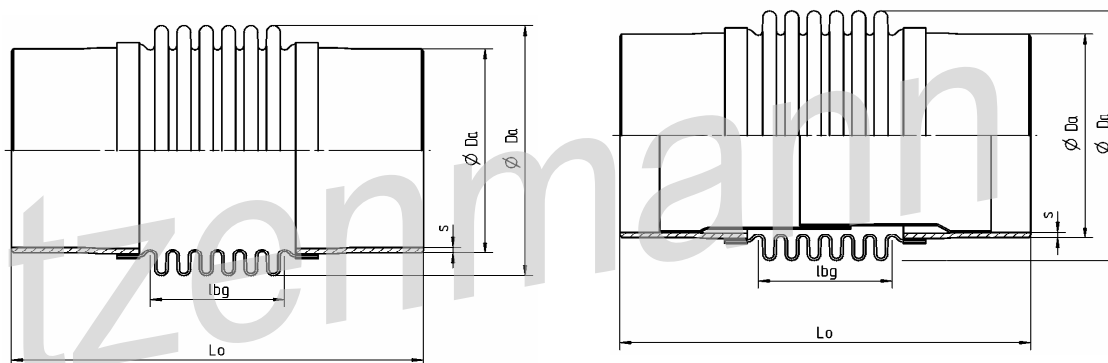


**PN 10**

Nominal diameter	Nominal axial movement absorption	Type  ARN 10 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	24	.0050.024.	214	1	1	60,3	4	80	0,4	89	54	46	31	5,6	87	1,1	259	1
50	46	.0050.046.	300	1,9	2,2	60,3	4	80	0,4	90	140	46,6	50	28	115	1,5	51	1
65	23	.0065.023.	205	1,4	1,6	76,1	4	80	0,6	107	45	68,7	26	3,7	102	1,9	654	2,1
65	37	.0065.037.	232	1,5	1,8	76,1	4	80	0,6	107	72	68,7	35	9,4	64	1,2	159	1,3
65	60	.0065.060.	325	3,2	3,6	76,1	4	80	0,6	110	165	70,9	50	35	109	2,1	53	2
80	20	.0080.020.	204	1,7	1,9	88,9	4	80	0,7	121	44	89,1	21	2,8	192	4,8	1670	5,5
80	41	.0080.041.	248	2	2,3	88,9	4	80	0,7	121	88	89,1	36	11	96	2,4	209	2,8
80	63	.0080.063.	328	3,6	4,1	88,9	4	80	0,7	123	168	90,8	48	33	118	3	71	3,1
100	26	.0100.026.	208	2,3	2,6	114,3	4	80	0,9	149	48	138	22	3,2	161	6,2	1817	9,7
100	53	.0100.053.	256	2,7	3,2	114,3	4	80	0,9	149	96	138	36	13	80	3,1	229	4,9
100	80	.0100.080.	370	6	7	114,3	4	80	0,9	152	210	141	48	42	131	5,1	78	6,7
125	30	.0125.030.	232	2,8	3,3	139,7	4	80	1,1	171	56	184	21	3,7	148	7,6	1646	14
125	53	.0125.053.	274	3,2	3,9	139,7	4	80	1,1	171	98	184	32	11	84	4,3	307	7,9
125	85	.0125.085.	384	7	8	139,7	4	80	1,1	174	208	187	46	38	138	7,2	113	11

## Axial expansion joints with weld ends

Type            **ARN 10...**

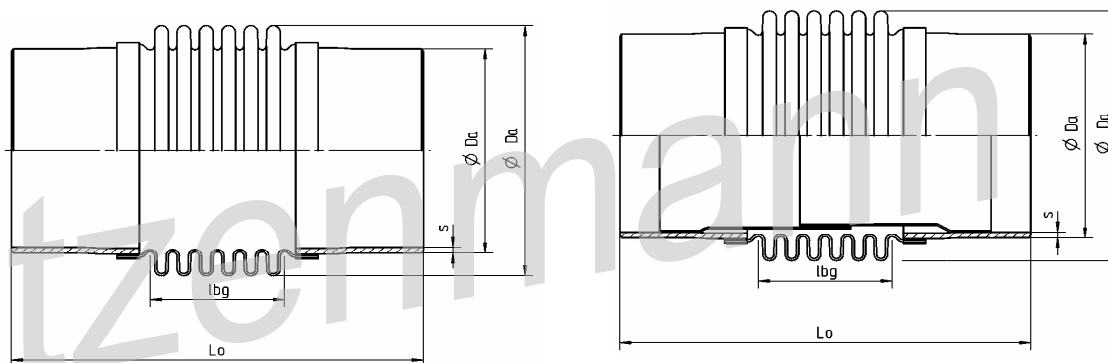


### PN 10

Nominal diameter	Nominal axial movement absorption	Type  ARN 10 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
150	32	.0150.032.	236	4,1	4,7	168,3	4,5	80	1,4	203	60	264	19	3,5	257	19	3564	39
150	64	.0150.064.	296	5	6	168,3	4,5	80	1,4	203	120	264	33	14	128	9,4	445	20
150	95	.0150.095.	384	9	11	168,3	4,5	80	1,4	205	208	267	43	36	136	10	157	19
200	40	.0200.040.	248	7	8	219,1	6,3	80	2,6	257	68	436	19	3,8	242	29	4318	78
200	80	.0200.080.	316	9	10	219,1	6,3	80	2,6	257	136	436	31	15	121	15	540	39
200	110	.0200.110.	378	13	15	219,1	6,3	80	2,6	260	198	441	41	31	140	17	297	44
250	48	.0250.048.	252	10	11	273	7,1	80	3,7	316	72	670	18	3,9	211	39	5156	138
250	84	.0250.084.	306	12	14	273	7,1	80	3,7	316	126	670	27	12	120	22	967	79
250	130	.0250.130.	484	24	27	273	7,1	80	3,7	319	304	677	32	45	201	38	278	56
300	45	.0300.045.	247	13	15	323,9	8	80	5	372	63	935	15	2,7	292	76	13045	326
300	90	.0300.090.	310	16	19	323,9	8	80	5	372	126	935	26	11	146	38	1631	163
300	137	.0300.137.	514	34	39	323,9	8	80	5	374	330	940	31	44	240	63	391	108

## Axial expansion joints with weld ends

Type      **ARN 10...**

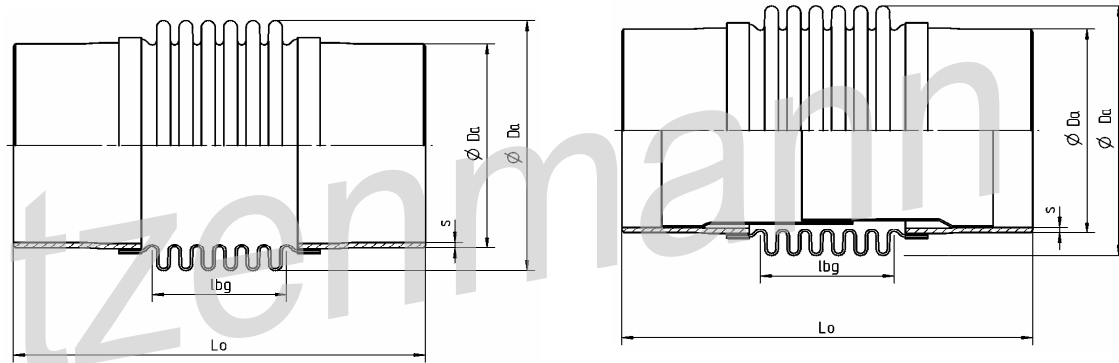


### PN 10

Nominal diameter	Nominal axial movement absorption	Type  ARN 10 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2Δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
350	60	.0350.060.	272	13	15	355,6	6	80	4,1	403	88	1113	17	4,7	251	78	6864	328
350	105	.0350.105.	338	16	20	355,6	6	80	4,1	403	154	1113	26	14	144	45	1282	188
350	160	.0350.160.	568	48	55	355,6	6	80	4,1	412	384	1140	33	54	271	86	394	167
400	48	.0400.048.	280	19	22	406,4	6	80	4,7	464	96	1466	12	3,6	730	297	21961	706
400	120	.0400.120.	424	32	38	406,4	6	80	4,7	464	240	1466	26	22	292	119	1405	282
400	168	.0400.168.	548	53	61	406,4	6	80	4,7	467	364	1476	32	47	270	111	568	261
450	56	.0450.056.	284	25	29	457	8	80	7	518	100	1844	13	3,9	706	362	24613	964
450	112	.0450.112.	384	36	42	457	8	80	7	518	200	1844	23	15	353	181	3081	482
450	168	.0450.168.	484	46	54	457	8	80	7	518	300	1844	28	35	235	120	912	321
500	66	.0500.066.	336	33	38	508	8	100	9,8	574	108	2273	14	4,4	625	395	23078	1229
500	116	.0500.116.	417	42	50	508	8	100	9,8	574	189	2273	22	14	357	225	4303	702
500	192	.0500.192.	564	71	82	508	8	100	9,8	576	336	2282	30	40	282	179	1077	542

## Axial expansion joints with weld ends

Type            **ARN 10...**



### PN 10

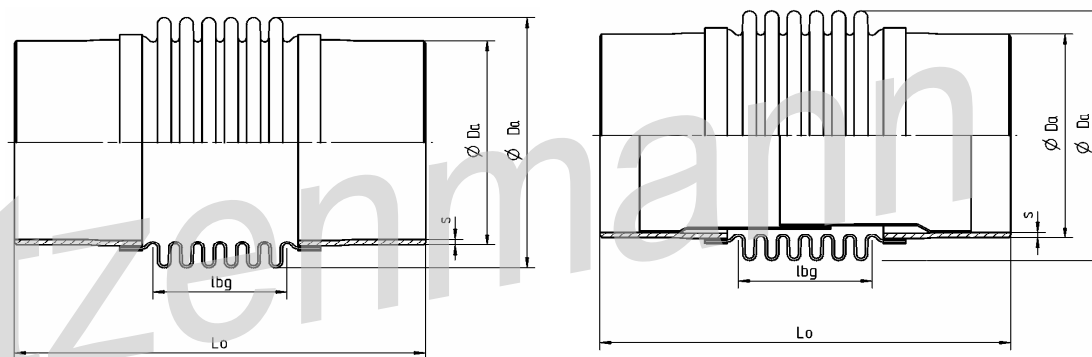
Nominal diameter	Nominal axial movement absorption	Type  ARN 10 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
600	72	.0600.072.	344	41	46	610	8	100	11,8	678	116	3222	12	4,3	649	581	29497	2027
600	144	.0600.144.	460	56	67	610	8	100	11,8	678	232	3222	21	17	325	291	3693	1013
600	216	.0600.216.	588	89	103	610	8	100	11,8	680	360	3232	28	40	292	262	1377	895
700	76	.0700.076.	356	56	63	711	8	100	13,8	785	128	4353	11	4,4	857	1036	43134	4031
700	152	.0700.152.	484	82	96	711	8	100	13,8	785	256	4353	20	17	428	518	5392	2015
700	209	.0700.209.	580	102	118	711	8	100	13,8	785	352	4353	24	33	311	376	2073	1466

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with weld ends

Type            **ARN 16...**



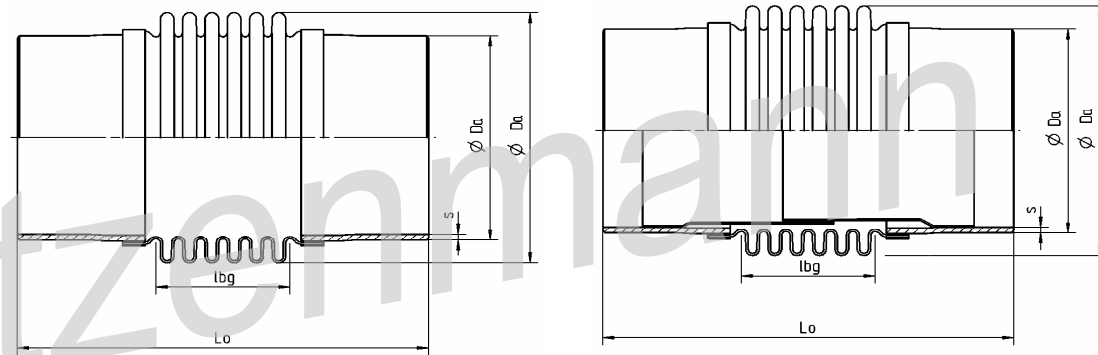
### PN 16

Nominal diameter	Nominal axial movement absorption	Type  ARN 16 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	L <sub>o</sub>	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	22	.0050.022.	214	1	1	60,3	4	80	0,4	89	54	46	29	5,2	146	1,9	430	1,5
50	42	.0050.042.	303	2,1	2,4	60,3	4	80	0,4	91	143	47,2	42	26	153	2	66	1,3
65	28	.0065.028.	220	1,6	1,8	76,1	4	80	0,6	108	60	69,4	29	5,9	126	2,4	457	2,5
65	48	.0065.048.	292	2,8	3,2	76,1	4	80	0,6	110	132	70,9	40	22	136	2,7	103	2,5
80	23	.0080.023.	220	2,1	2,4	88,9	4	80	0,7	122	60	89,9	23	4,3	278	6,9	1302	7,3
80	50	.0080.050.	292	3,2	3,6	88,9	4	80	0,7	123	132	90,8	38	20	150	3,8	146	3,9
100	31	.0100.031.	225	2,8	3,2	114,3	4	80	0,9	150	65	139	24	5	227	8,8	1400	13
100	58	.0100.058.	314	5	6	114,3	4	80	0,9	152	154	141	37	22	178	7	198	9,2
125	21	.0125.021.	218	3	3,4	139,7	4	80	1,1	172	42	185	15	1,9	350	18	6932	31
125	42	.0125.042.	260	3,7	4,3	139,7	4	80	1,1	172	84	185	27	7,7	175	9	867	15
125	65	.0125.065.	336	6	7	139,7	4	80	1,1	174	160	187	36	22	180	9,4	248	14
150	24	.0150.024.	221	3,8	4,3	168,3	4,5	80	1,4	203	45	264	14	2	342	25	8455	52
150	48	.0150.048.	266	4,7	6	168,3	4,5	80	1,4	203	90	264	25	7,8	171	13	1054	26
150	73	.0150.073.	336	8	9	168,3	4,5	80	1,4	205	160	267	34	21	176	13	345	25



## Axial expansion joints with weld ends

Type      **ARN 16...**

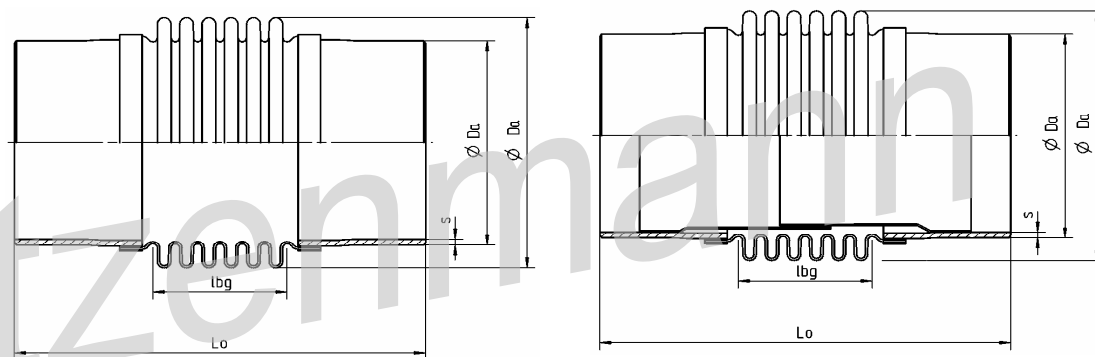


### PN 16

Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
		ARN 16 ...		without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	L <sub>o</sub>	G	G	D <sub>a</sub>	s	L	G	D <sub>a</sub>	l <sub>b</sub>	A <sub>e</sub>	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	c <sub>T</sub>
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
200	30	.0200.030.	234	8	8	219,1	6,3	80	2,6	260	54	441	14	2,3	514	63	14678	161
200	60	.0200.060.	288	10	11	219,1	6,3	80	2,6	260	108	441	26	9,1	257	31	1835	80
200	97	.0200.097.	450	19	21	219,1	6,3	80	2,6	262	270	445	29	37	276	34	316	40
250	32	.0250.032.	256	11	12	273	7,1	80	3,7	318	76	674	12	2,8	640	120	14135	179
250	64	.0250.064.	332	14	16	273	7,1	80	3,7	318	152	674	20	11	320	60	1767	89
250	103	.0250.103.	440	23	26	273	7,1	80	3,7	320	260	679	27	30	300	57	568	82
300	40	.0300.040.	268	16	18	323,9	8	80	5	374	84	940	13	3,2	705	184	17764	336
300	80	.0300.080.	352	21	25	323,9	8	80	5	374	168	940	21	13	352	92	2220	168
300	120	.0300.120.	529	42	48	323,9	8	80	5	376	345	946	25	40	327	86	489	143
350	40	.0350.040.	268	18	20	355,6	8	80	5,5	408	84	1128	12	3	690	216	20856	435
350	90	.0350.090.	373	25	29	355,6	8	80	5,5	408	189	1128	20	15	307	96	1834	193
350	130	.0350.130.	496	43	50	355,6	8	80	5,5	412	312	1140	26	35	334	106	736	205

## Axial expansion joints with weld ends

Type            **ARN 16...**



### PN 16

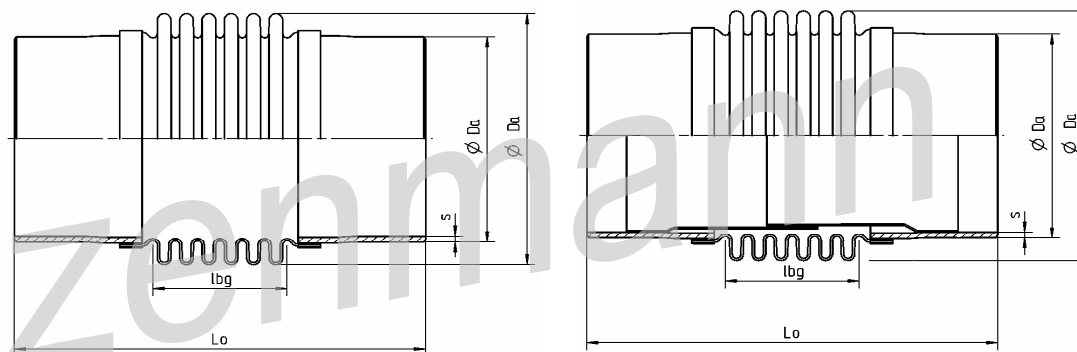
Nominal diameter	Nominal axial movement absorption	Type  ARN 16 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick- ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	$2\delta_N$	-	L <sub>o</sub>	G	G	D <sub>a</sub>	s	L	G	D <sub>a</sub>	l <sub>b</sub>	A <sub>e</sub>	$2\alpha_N$	$2\lambda_N$	$c_\delta$	$c_\alpha$	$c_\lambda$	c <sub>T</sub>
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
400	48	.0400.048.	288	26	29	406,4	8	80	6,2	467	104	1476	12	3,8	946	388	24342	914
400	96	.0400.096.	392	38	43	406,4	8	80	6,2	467	208	1476	22	15	473	194	3043	457
400	132	.0400.132.	470	47	54	406,4	8	80	6,2	467	286	1476	25	29	344	141	1172	332
450	52	.0450.052.	288	29	33	457	8	80	7	520	104	1851	12	3,7	954	491	30826	1275
450	104	.0450.104.	392	43	50	457	8	80	7	520	208	1851	21	15	477	245	3857	638
450	143	.0450.143.	470	54	62	457	8	80	7	520	286	1851	24	28	347	178	1483	464
500	48	.0500.048.	312	34	37	508	8	100	9,8	576	84	2282	9,9	2,5	1128	715	68986	2169
500	96	.0500.096.	396	46	53	508	8	100	9,8	576	168	2282	18	10	564	357	8616	1085
500	144	.0500.144.	480	59	68	508	8	100	9,8	576	252	2282	24	22	376	238	2553	723

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with weld ends

Type        **ARN 25...**

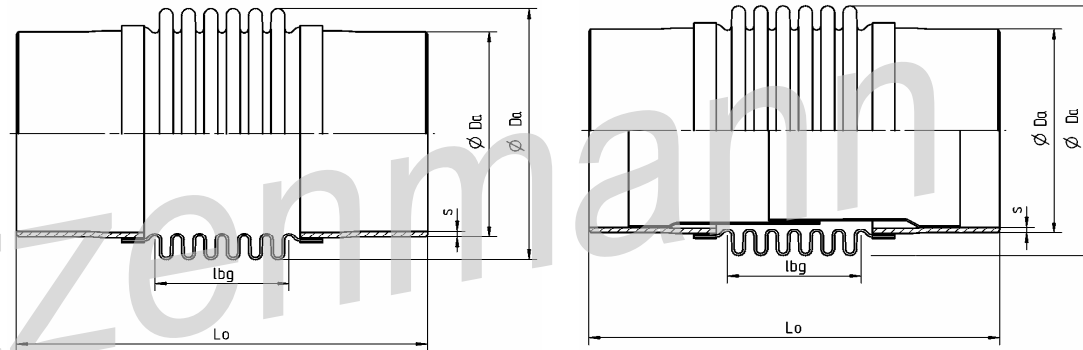


### PN 25

Nominal diameter	Nominal axial movement absorption	Type  ARN 25 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	17	.0050.017.	210	1	1	60,3	4	80	0,4	90	50	46,6	22	3,6	321	4,2	1113	2,9
50	32	.0050.032.	270	1,8	2	60,3	4	80	0,4	91	110	47,2	33	15	199	2,6	144	1,7
65	21	.0065.021.	215	1,8	2	76,1	4	80	0,6	109	55	70,1	23	4,1	272	5,3	1182	5
65	40	.0065.040.	292	3,2	3,6	76,1	4	80	0,6	111	132	71,6	33	18	218	4,3	166	3,6
80	23	.0080.023.	220	2,3	2,6	88,9	4	80	0,7	123	60	90,8	22	4,2	329	8,3	1555	8,6
80	42	.0080.042.	290	3,6	4	88,9	4	80	0,7	125	130	92,5	32	17	222	5,7	227	5,5
100	23	.0100.023.	212	2,8	3,1	114,3	4	80	0,9	151	52	140	18	3	340	13	3302	19
100	48	.0100.048.	286	4,6	5	114,3	4	80	0,9	152	126	141	30	15	218	8,5	361	11
125	26	.0125.026.	240	3,9	4,4	139,7	4	80	1,1	174	64	187	18	3,6	450	23	3864	36
125	52	.0125.052.	304	5	6	139,7	4	80	1,1	174	128	187	29	14	225	12	483	18
150	29	.0150.029.	240	4,9	6	168,3	4,5	80	1,4	205	64	267	17	3,4	440	33	5410	62
150	58	.0150.058.	304	7	8	168,3	4,5	80	1,4	205	128	267	27	14	220	16	676	31

## Axial expansion joints with weld ends

Type            **ARN 25...**



### PN 25

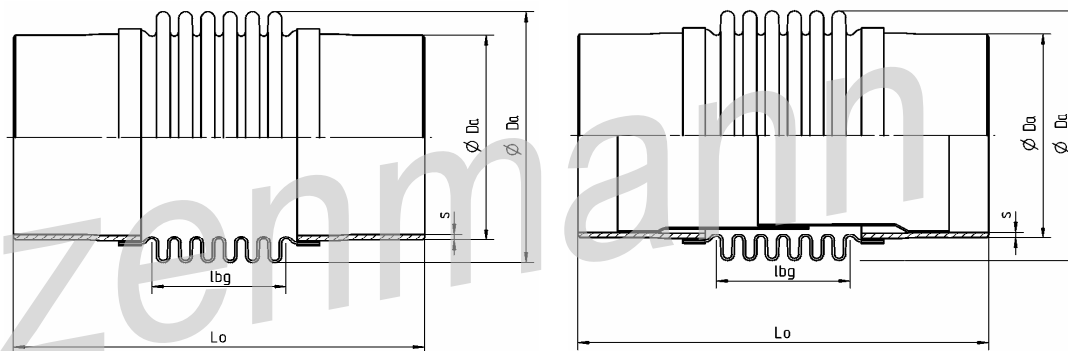
Nominal diameter	Nominal axial movement absorption	Type  ARN 25 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	L <sub>o</sub>	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
200	26	.0200.026.	252	9	9	219,1	6,3	80	2,6	261	72	443	12	2,6	855	105	13759	124
200	52	.0200.052.	324	11	13	219,1	6,3	80	2,6	261	144	443	20	11	428	53	1722	62
200	71	.0200.071.	378	15	17	219,1	6,3	80	2,6	262	198	445	23	20	376	46	802	54
250	24	.0250.024.	240	12	13	273	7,1	80	3,7	320	60	679	9	1,6	1298	245	46135	353
250	48	.0250.048.	300	15	17	273	7,1	80	3,7	320	120	679	16	6,5	649	122	5762	177
250	79	.0250.079.	380	20	22	273	7,1	80	3,7	320	200	679	21	18	390	74	1245	106
300	27	.0300.027.	250	15	17	323,9	8	80	5	374	66	940	8,7	1,7	1200	313	48892	542
300	55	.0300.055.	316	20	23	323,9	8	80	5	374	132	940	16	7	600	157	6112	271
300	82	.0300.082.	382	24	29	323,9	8	80	5	374	198	940	19	16	400	104	1809	181
350	30	.0350.030.	256	19	21	355,6	8	80	5,5	412	72	1140	8,8	1,9	1445	458	59854	890
350	70	.0350.070.	352	29	33	355,6	8	80	5,5	412	168	1140	18	10	619	196	4714	382
350	100	.0350.100.	424	36	41	355,6	8	80	5,5	412	240	1140	21	21	434	137	1618	267
400	40	.0400.040.	309	29	32	406,4	8	80	6,2	466	125	1473	10	3,8	1548	633	27484	789
400	80	.0400.080.	434	45	51	406,4	8	80	6,2	466	250	1473	17	15	774	317	3433	394
400	112	.0400.112.	562	66	74	406,4	8	80	6,2	469	378	1483	19	32	600	247	1171	317

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Axial expansion joints with weld ends

Type            **ARN 40...**

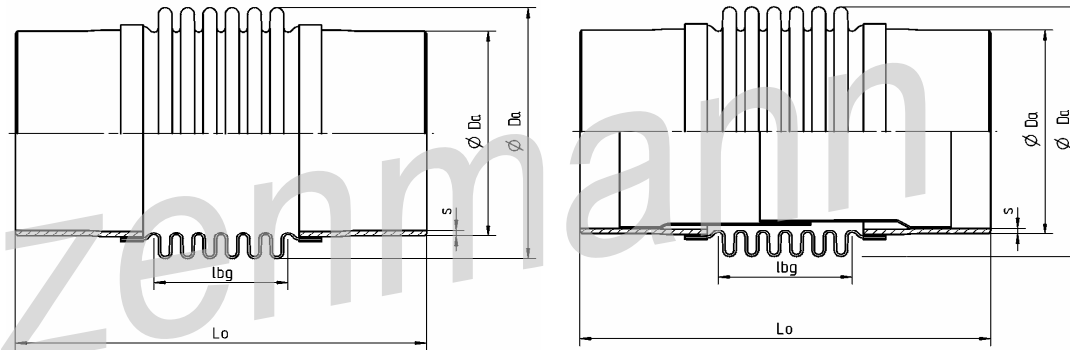


### PN 40

Nominal diameter	Nominal axial movement absorption	Type  ARN 40 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	L <sub>o</sub>	G	G	Da	s	L	G	Da	l <sub>b</sub>	A <sub>e</sub>	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	13	.0050.013.	204	1	1	60,3	4	80	0,4	91	44	47,2	17	2,4	497	6,5	2252	4,2
50	26	.0050.026.	248	1,6	1,8	60,3	4	80	0,4	91	88	47,2	26	9,7	248	3,2	282	2,1
65	18	.0065.018.	220	2,2	2,4	76,1	4	80	0,6	111	60	71,6	19	3,8	481	9,6	1775	7,8
65	32	.0065.032.	268	2,9	3,2	76,1	4	80	0,6	111	108	71,6	26	12	267	5,3	304	4,4
80	17	.0080.017.	212	2,4	2,7	88,9	4	80	0,7	125	52	92,5	16	2,7	556	14	3540	14
80	34	.0080.034.	264	3,2	3,6	88,9	4	80	0,7	125	104	92,5	25	11	278	7,1	442	6,9
100	16	.0100.016.	225	2,7	3,1	114,3	4	80	0,9	147	65	136	12	2,6	715	27	4316	14
100	36	.0100.036.	329	4,7	5	114,3	4	80	0,9	147	169	136	18	16	410	15	365	7,4
125	24	.0125.024.	272	4,7	5	139,7	4	80	1,1	174	96	187	15	5	696	36	2646	25
125	44	.0125.044.	363	8	9	139,7	4	80	1,1	175	187	189	21	18	470	25	472	16
150	29	.0150.029.	272	6	7	168,3	4,5	80	1,4	206	96	269	15	5	644	48	3521	42
150	52	.0150.052.	427	14	15	168,3	4,5	80	1,4	208	247	272	20	23	543	41	449	31

## Axial expansion joints with weld ends

Type            **ARN 40...**



### PN 40

Nominal diameter	Nominal axial movement absorption	Type  ARN 40 ...	Overall length	Weight approx.		Weld ends				Bellows			absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
				without inner sleeve	with inner sleeve	outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	L <sub>o</sub>	G	G	Da	s	L	G	Da	lb	Ae	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
200	22	.0200.022.	260	11	11	219,1	6,3	80	2,6	263	80	447	10	2,5	1530	190	19958	197
200	44	.0200.044.	340	15	17	219,1	6,3	80	2,6	263	160	447	17	9,8	765	95	2493	99
200	61	.0200.061.	400	19	20	219,1	6,3	80	2,6	263	220	447	19	19	556	69	959	72
250	21	.0250.021.	243	13	14	273	7,1	80	3,7	322	63	683	7,8	1,5	1779	338	57458	467
250	49	.0250.049.	327	19	21	273	7,1	80	3,7	322	147	683	16	8,1	762	145	4525	200
250	70	.0250.070.	390	24	27	273	7,1	80	3,7	322	210	683	18	17	534	101	1551	140
300	24	.0300.024.	276	20	22	323,9	8	80	5	376	92	946	7,5	2,1	2379	625	49912	568
300	54	.0300.054.	391	30	34	323,9	8	80	5	376	207	946	14	11	1057	278	4380	252
300	77	.0300.077.	534	47	53	323,9	8	80	5	378	350	951	15	26	775	205	1127	184

1) Inner sleeve, movement absorption: The inner sleeve is designed for axial movement only.

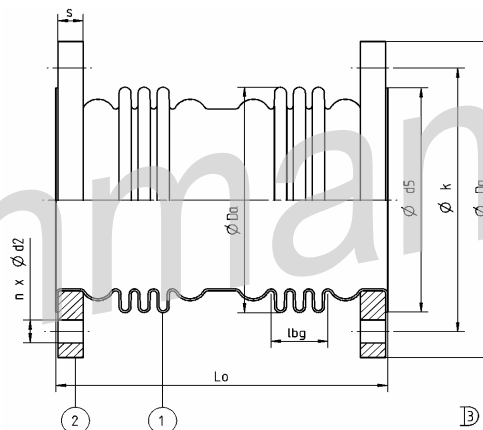
The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Universal Expansion Joints

- with swivel lap-joint flanges	Type <b>UBN</b>	
	PN 01	page 1
	PN 06	page 2
- with plain fixed flanges	Type <b>UFN</b>	
	PN 01	page 1
	PN 06	page 2
- with weld ends	Type <b>URN</b>	
	PN 01	page 1
	PN 06	page 2

# Universal expansion joints for low pressure with swivel lap-joint flanges

Type            **UBG 01...**



**PN 1**

Nominal diameter	Nominal axial movement absorption	Type  UBG 01 ...	Overall length	Weight approx.	Flange				Bellows				absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C			Torsional rigidity
					drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	middle distance of the bellows	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	PN	d5	s	G	Da	lb	Ae	l*	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	mm	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	56	.0050.056.0	378	2,6	6	90	10	0,9	89	63	46	257	41	154	37	1	1,6	0,4
65	83	.0065.083.0	418	3,4	6	107	10	1,1	107	81	68,7	279	49	197	28	1,1	1,6	0,6
80	95	.0080.095.0	427	4,6	6	122	10	1,6	121	90	89,1	280	49	196	26	1,3	1,9	0,8
100	119	.0100.119.0	447	6	6	147	10	1,8	148	99	137	291	50	203	24	1,9	2,5	1,5
125	144	.0125.144.0	457	7	6	178	10	2,2	174	104	187	286	50	204	18	1,9	2,6	2,2
150	144	.0150.144.0	470	7	6	202	10	2,4	203	104	264	299	43	181	21	3,1	4	3,9
200	160	.0200.160.0	490	14	6	258	16	5,2	255	120	432	292	37	149	23	5,6	7,4	8
250	168	.0250.168.0	500	17	6	312	16	6,2	312	119	661	293	32	127	27	9,7	13	17
300	196	.0300.196.0	490	22	6	365	16	8,3	365	133	916	269	31	112	26	13	21	26
350	180	.0350.180.0	510	27	6	410	16	10,7	400	120	1104	302	26	109	27	17	21	38
400	156	.0400.156.0	490	35	6	465	16	11,7	458	126	1445	266	20	71	88	71	114	83
450	140	.0450.140.0	490	40	6	520	16	13,6	513	110	1825	282	16	62	97	99	142	133
500	136	.0500.136.0	500	42	6	570	16	14,6	569	92	2252	310	14	62	107	135	160	213

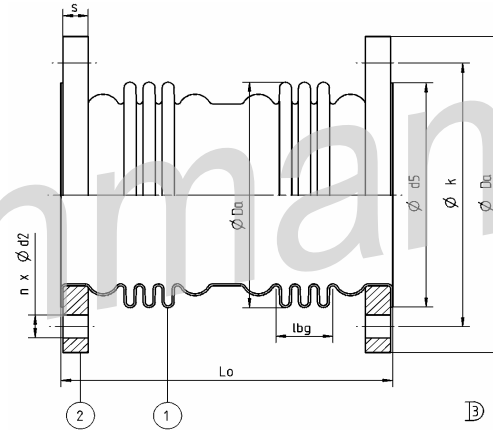
1) Movement absorption:

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.



## Universal expansion joints with swivel lap-joint flanges

Type            **UBN 06...**



**PN 6**

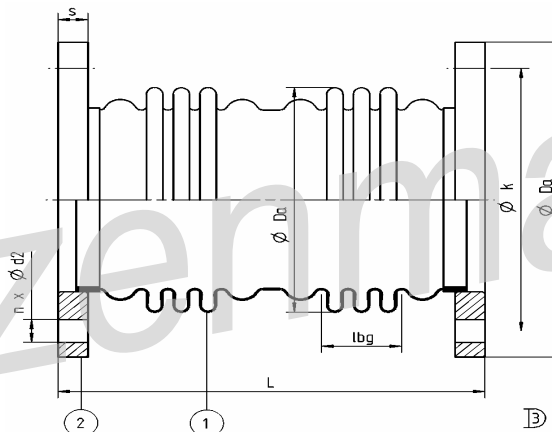
Nominal diameter	Nominal axial movement absorption	Type  UBN 06 ...	Overall length	Weight approx.	Flange				Bellows				absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C			Torsional rigidity
					drilling acc. to EN 1092	rim diameter	thick-ness	Weight	outside diameter	corrugated length	effective area	middle distance of the bellows	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	PN	d5	s	G	Da	lb	Ae	l*	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	-	mm	mm	kg	mm	mm	cm <sup>2</sup>	mm	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	44	.0050.044.0	341	3,8	6	90	16	1,4	89	54	46	216	32	102	73	1,9	4,5	0,7
65	55	.0065.055.0	341	5	6	107	16	1,8	108	60	69,4	210	32	99	63	2,4	6,2	1,3
80	61	.0080.061.0	364	7	6	122	18	2,8	121	66	89,1	224	31	102	64	3,2	7,2	1,8
100	73	.0100.073.0	385	10	6	147	18	3,1	150	78	139	232	30	99	94	7,3	15	5,4
125	84	.0125.084.0	413	13	6	178	20	4,3	172	84	185	240	30	101	88	9	18	7,7
150	96	.0150.096.0	430	15	6	202	20	4,8	203	90	264	251	28	101	86	13	23	13
200	100	.0200.100.0	470	21	6	258	22	6,9	257	85	436	293	23	99	97	23	31	31
250	120	.0250.120.0	410	26	6	312	24	8,8	316	90	670	214	22	66	84	31	78	55
300	100	.0300.100.0	430	32	6	365	24	12,2	371	95	932	230	15	50	111	58	125	55
350	110	.0350.110.0	440	43	6	410	26	17,1	405	100	1119	231	15	50	109	68	146	70
400	130	.0400.130.0	460	56	6	465	28	20,1	461	110	1456	227	16	50	144	117	258	143
450	140	.0450.140.0	480	65	6	520	28	23,3	514	115	1828	242	16	51	146	149	289	198
500	132	.0500.132.0	490	76	6	570	28	25,1	572	100	2265	266	14	50	207	260	419	415

1) Movement absorption:

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

# Universal expansion joints for low pressure with plain fixed flanges

Type            UFG 01...



PN 1

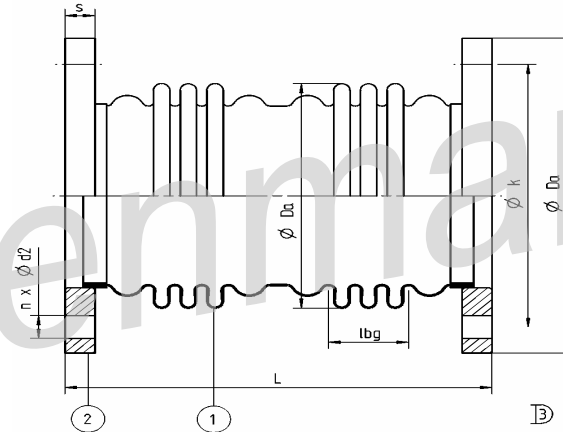
Nominal diameter	Nominal axial movement absorption	Type  UFG 01 ...	Overall length	Weight approx.	Flange			Bellows				absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
					drilling acc. to EN 1092	thick-ness	Weight	outside diameter	corrugated length	effective area	middle distance of the bellows	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	PN	s	G	Da	lb	Ae	l*	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	-	mm	kg	mm	mm	cm <sup>2</sup>	mm	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	56	.0050.056.0	398	2,4	6	10	0,9	89	63	46	257	41	154	37	1	1,6	0,4
65	83	.0065.083.0	438	3,2	6	10	1,1	107	81	68,7	279	49	197	28	1,1	1,6	0,6
80	95	.0080.095.0	448	4,2	6	10	1,6	121	90	89,1	280	49	196	26	1,3	1,9	0,8
100	119	.0100.119.0	468	6	6	10	1,8	148	99	137	291	50	203	24	1,9	2,5	1,5
125	144	.0125.144.0	478	6	6	10	2,2	174	104	187	286	50	204	18	1,9	2,6	2,2
150	144	.0150.144.0	491	7	6	10	2,4	203	104	264	299	43	181	21	3,1	4	3,9
200	160	.0200.160.0	506	13	6	16	5,2	255	120	432	292	37	149	23	5,6	7,4	8
250	168	.0250.168.0	516	16	6	16	6,2	312	119	661	293	32	127	27	9,7	13	17
300	196	.0300.196.0	506	22	6	16	8,3	365	133	916	269	31	112	26	13	21	26
350	180	.0350.180.0	526	26	6	16	10,7	400	120	1104	302	26	109	27	17	21	38
400	156	.0400.156.0	506	33	6	16	11,7	458	126	1445	266	20	71	88	71	114	83
450	140	.0450.140.0	506	38	6	16	13,6	513	110	1825	282	16	62	97	99	142	133
500	136	.0500.136.0	516	40	6	16	14,6	569	92	2252	310	14	62	107	135	160	213

1) Movement absorption:

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Universal expansion joints with plain fixed flanges

Type            UFN 06...



PN 6

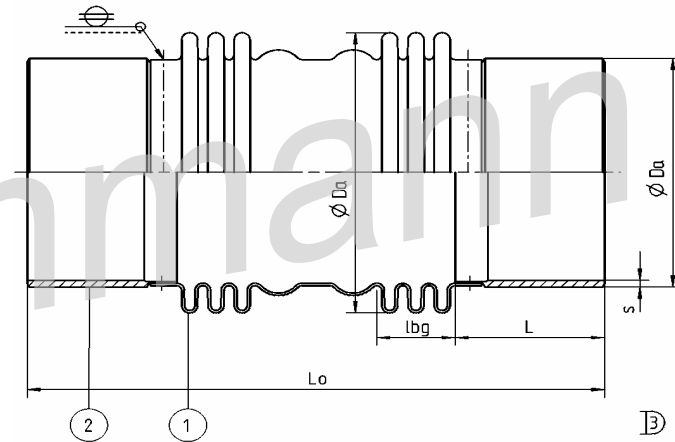
Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.	Flange			Bellows				absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C per bellows			Torsional rigidity
		UFN 06 ...			drilling acc. to EN 1092	thick- ness	Weight	outside diameter	corrugated length	effective area	middle distance of the bellows	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	PN	s	G	Da	lb	Ae	l*	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	-	mm	kg	mm	mm	cm²	mm	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	44	.0050.044.0	354	3,6	6	16	1,4	89	54	46	216	32	102	73	1,9	4,5	0,7
65	55	.0065.055.0	354	4,4	6	16	1,7	108	60	69,4	210	32	99	63	2,4	6,2	1,3
80	61	.0080.061.0	376	7	6	18	2,8	121	66	89,1	224	31	102	64	3,2	7,2	1,8
100	73	.0100.073.0	396	9	6	18	3,1	150	78	139	232	30	99	94	7,3	15	5,4
125	84	.0125.084.0	422	13	6	20	4,3	172	84	185	240	30	101	88	9	18	7,7
150	96	.0150.096.0	439	14	6	20	4,6	203	90	264	251	28	101	86	13	23	13
200	100	.0200.100.0	478	19	6	22	6,7	257	85	436	293	23	99	97	23	31	31
250	120	.0250.120.0	416	25	6	24	8,8	316	90	670	214	22	66	84	31	78	55
300	100	.0300.100.0	437	30	6	24	11,9	371	95	932	230	15	50	111	58	125	55
350	110	.0350.110.0	445	40	6	26	16,7	405	100	1119	231	15	50	109	68	146	70
400	130	.0400.130.0	457	53	6	28	20,1	461	110	1456	227	16	50	144	117	258	143
450	140	.0450.140.0	477	62	6	28	23,3	514	115	1828	242	16	51	146	149	289	198
500	132	.0500.132.0	486	71	6	28	24,5	572	100	2265	266	14	50	207	260	419	415

1) Movement absorption:

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

# Universal expansion joints for low pressure with weld ends

Type            URG 01...



PN 1

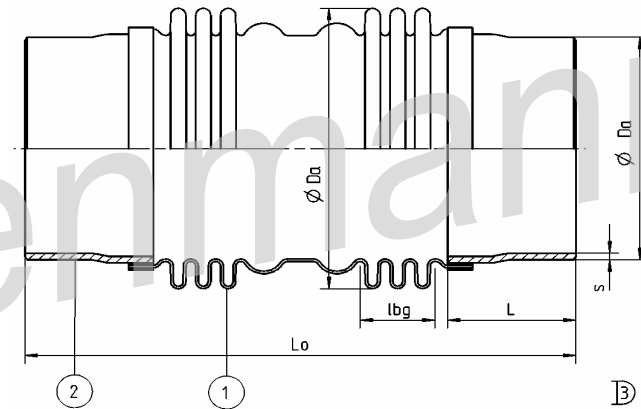
Nominal diameter	Nominal axial movement absorption	Type  URG 01 ...	Overall length	Weight approx.	Weld ends				Bellows				absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C			Torsional rigidity
					outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	middle distance of the bellows	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	L <sub>o</sub>	G	Da	s	L	G	Da	l <sub>bg</sub>	A <sub>e</sub>	l*	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	mm	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	56	.0050.056.0	480	1,4	60,3	4	80	0,4	89	63	46	257	41	154	37	1	1,6	0,4
65	83	.0065.083.0	520	2,2	76,1	4	80	0,6	107	81	68,7	279	49	197	28	1,1	1,6	0,6
80	95	.0080.095.0	530	2,6	88,9	4	80	0,7	121	90	89,1	280	49	196	26	1,3	1,9	0,8
100	119	.0100.119.0	550	3,4	114,3	4	80	0,9	148	99	137	291	50	203	24	1,9	2,5	1,5
125	144	.0125.144.0	550	4,2	139,7	4	80	1,1	174	104	187	286	50	204	18	1,9	2,6	2,2
150	144	.0150.144.0	563	5	168,3	4	80	1,3	203	104	264	299	43	181	21	3,1	4	3,9
200	160	.0200.160.0	572	7	219,1	4	80	1,7	255	120	432	292	37	149	23	5,6	7,4	8
250	168	.0250.168.0	572	8	273	4	80	2,1	312	119	661	293	32	127	27	9,7	13	17
300	196	.0300.196.0	562	10	323,9	4	80	2,5	365	133	916	269	31	112	26	13	21	26
350	180	.0350.180.0	582	11	355,6	4	80	2,8	400	120	1104	302	26	109	27	17	21	38
400	156	.0400.156.0	552	17	406,4	4	80	3,2	458	126	1445	266	20	71	88	71	114	83
450	140	.0450.140.0	552	18	457	4	80	3,6	513	110	1825	282	16	62	97	99	142	133
500	136	.0500.136.0	602	21	508	4	100	4,9	569	92	2252	310	14	62	107	135	160	213

1) Movement absorption:

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Universal expansion joints with weld ends

Type            URN 06...



PN 6

Nominal diameter	Nominal axial movement absorption	Type	Overall length	Weight approx.	Weld ends				Bellows				absorption of movements <sup>1)</sup> nominal at 1000 cycles		Spring rates at 20°C			Torsional rigidity
		URN 06 ...			outside diameter	wall thick-ness	length	Weight	outside diameter	corrugated length	effective area	middle distance of the bellows	angular <sup>1)</sup>	lateral <sup>1)</sup>	axial	angular	lateral	
DN	2δ <sub>N</sub>	-	Lo	G	Da	s	L	G	Da	lbg	Ae	l*	2α <sub>N</sub>	2λ <sub>N</sub>	c <sub>δ</sub>	c <sub>α</sub>	c <sub>λ</sub>	cT
-	mm	-	mm	kg	mm	mm	mm	kg	mm	mm	cm <sup>2</sup>	mm	deg	mm	N/mm	Nm/deg	N/mm	kNm/deg
50	44	.0050.044.	430	1,6	60,3	4	80	0,4	89	54	46	216	32	102	73	1,9	4,5	0,7
65	55	.0065.055.	430	2,3	76,1	4	80	0,6	108	60	69,4	210	32	99	63	2,4	6,2	1,3
80	61	.0080.061.	450	2,7	88,9	4	80	0,7	121	66	89,1	224	31	102	64	3,2	7,2	1,8
100	73	.0100.073.	470	4,7	114,3	4	80	0,9	150	78	139	232	30	99	94	7,3	15	5,4
125	84	.0125.084.	500	6	139,7	4	80	1,1	172	84	185	240	30	101	88	9	18	7,7
150	96	.0150.096.	517	8	168,3	4,5	80	1,4	203	90	264	251	28	101	86	13	23	13
200	100	.0200.100.	558	12	219,1	6,3	80	2,6	257	85	436	293	23	99	97	23	31	31
250	120	.0250.120.	484	15	273	7,1	80	3,7	316	90	670	214	22	66	84	31	78	55
300	100	.0300.100.	509	17	323,9	8	80	5	371	95	932	230	15	50	111	58	125	55
350	110	.0350.110.	515	16	355,6	6	80	4,1	405	100	1119	231	15	50	109	68	146	70
400	130	.0400.130.	521	23	406,4	6	80	4,7	461	110	1456	227	16	50	144	117	258	143
450	140	.0450.140.	541	26	457	6	80	5,3	514	115	1828	242	16	51	146	149	289	198
500	132	.0500.132.	594	37	508	6	100	7,4	572	100	2265	266	14	50	207	260	419	415

1) Movement absorption:

The movements (axial, angular, lateral) are to be regarded as alternatives, i.e. the sum of their proportions in percentages should not exceed 100%.

## Angular Expansion Joints

- with swivel lap-joint flanges

Type **WBN** (hinged EJ)

PN 06	page 1 to 3
PN 10	page 4 to 6
PN 16	page 7 to 8
PN 25	page 9 to 10

- with swivel lap-joint flanges

Type **WBK** (gimbal EJ)

PN 06	page 1 to 2
PN 10	page 3 to 4
PN 16	page 5 to 6
PN 25	page 7 to 8

- with plain fixed flanges

Type **WFN** (hinged EJ)

PN 06	page 1 to 3
PN 10	page 4 to 6
PN 16	page 7 to 8
PN 25	page 9 to 10

- with plain fixed flanges

Type **WFK** (gimbal EJ)

PN 06	page 1 to 2
PN 10	page 3 to 4
PN 16	page 5 to 6
PN 25	page 7 to 8

- with weld ends

Type **WRN** (hinged EJ)

PN 02	page 1 to 4
PN 06	page 5 to 10
PN 10	page 11 to 15
PN 16	page 16 to 20
PN 25	page 21 to 24
PN 40	page 25 to 28
PN 63	page 29 to 31

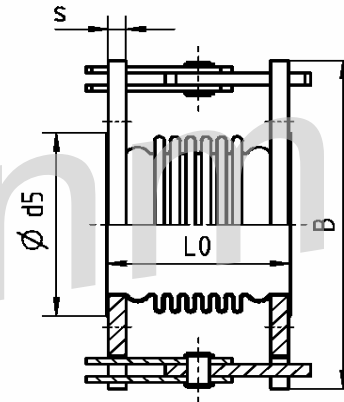
- with weld ends

Type **WRK** (gimbal EJ)

PN 02	page 1 to 3
PN 06	page 4 to 8
PN 10	page 9 to 13
PN 16	page 14 to 17
PN 25	page 18 to 20
PN 40	page 21 to 23
PN 63	page 24 to 16

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 06 ...

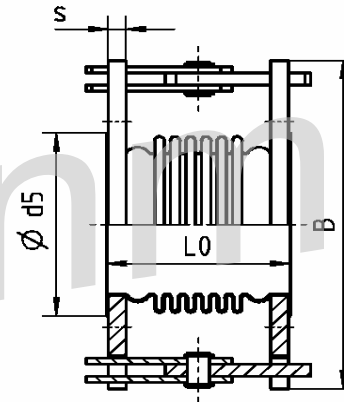


**PN 6**

Nominal diameter	Nominal angular movement absorption	Type  WBN 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	33	.0050.330.0	121	7	245	6	90	16	2	54	46	0,5	1,1	0,07	1
50	41	.0050.410.0	141	7	245	6	90	16	2	72	46	0,5	0,8	0,1	0,7
65	27	.0065.270.0	111	8	280	6	107	16	3	45	69	0,7	1,9	0,1	2,1
65	39	.0065.390.0	141	9	280	6	107	16	3	72	69	0,7	1,2	0,1	1,3
80	27	.0080.270.0	121	11	305	6	122	18	4	50	89	0,9	2,3	0,1	2,9
80	38	.0080.380.0	151	12	305	6	122	18	4	80	89	0,9	1,5	0,2	1,8
100	27	.0100.270.0	131	12	320	6	147	18	5	55	137	1,4	3,3	0,2	5,3
100	38	.0100.380.0	161	12	320	6	147	18	5	88	137	1,4	2,1	0,4	3,3
125	30	.0125.300.0	151	15	350	6	178	20	6	65	187	1,9	3	0,4	6,9
125	39	.0125.390.0	181	16	350	6	178	20	6	91	187	1,9	2,1	0,5	4,9
150	23	.0150.230.0	162	16	365	6	202	20	7	70	263	2,6	8,5	0,5	19
150	36	.0150.360.0	212	18	365	6	202	20	7	126	263	2,6	4,7	1,0	11

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 06 ...



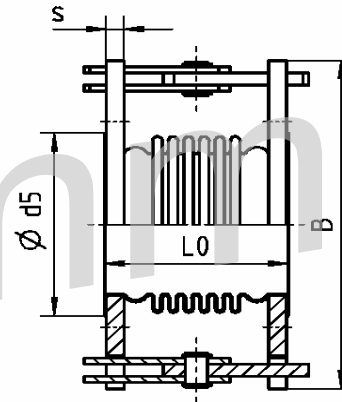
### PN 6

Nominal diameter	Nominal angular movement absorption	Type  WBN 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	23	.0200.230.0	172	22	420	6	258	22	9	80	434	4,3	13	1,0	38
200	34	.0200.340.0	233	25	420	6	258	22	9	136	436	4,4	15	1,7	39
250	18	.0250.180.0	183	29	470	6	312	24	12	72	670	6,7	39	1,4	138
250	32	.0250.320.0	253	31	470	6	312	24	12	144	670	6,7	20	2,8	69
300	19	.0300.190.0	183	38	560	6	365	24	15	80	932	9,3	47	2,2	207
300	34	.0300.340.0	263	41	560	6	365	24	15	160	932	9,3	24	4,3	104
350	18	.0350.180.0	193	60	655	6	410	26	23	84	1110	20	65	2,7	278
350	34	.0350.340.0	314	69	655	6	410	26	23	198	1113	20	35	6,4	146
400	13	.0400.130.0	213	68	675	6	465	28	26	88	1456	26	146	3,7	359
400	27	.0400.270.0	343	77	675	6	465	28	26	220	1456	26	58	9,3	143
450	13	.0450.130.0	213	76	735	6	520	28	29	92	1828	33	186	4,9	496
450	24	.0450.240.0	333	85	735	6	520	28	29	207	1828	33	83	11,0	220



## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 06 ...

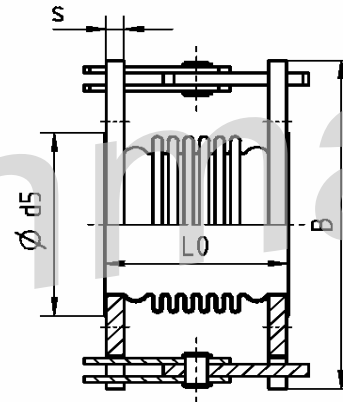


### PN 6

Nominal diameter	Nominal angular movement absorption	Type  WBN 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	14	.0500.140.0	224	86	795	6	570	28	32	100	2265	41	260	6,6	831
500	26	.0500.260.0	354	99	795	6	570	28	32	225	2265	41	116	15,0	369
600	13	.0600.130.0	254	155	965	6	670	37	55	112	3217	77	370	10,0	1344
600	25	.0600.250.0	394	174	965	6	670	37	55	252	3217	77	164	24,0	597
700	14	.0700.140.0	284	176	1065	6	775	37	62	140	4324	104	422	18,0	1673
700	25	.0700.250.0	446	219	1065	6	775	37	62	300	4342	104	308	38,0	1225
800	11	.0800.110.0	296	241	1185	6	880	43	87	132	5621	135	1002	22,0	4350
800	23	.0800.230.0	496	285	1185	6	880	43	87	330	5621	135	401	54,0	1740

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 10 ...

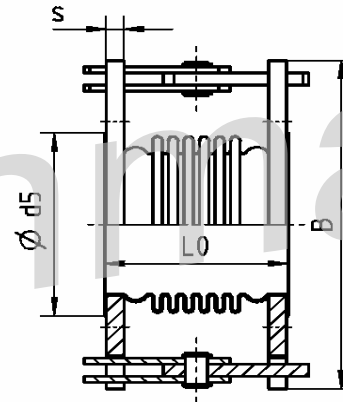


**PN 10**

Nominal diameter	Nominal angular movement absorption	Type  WBN 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	31	.0050.310.0	131	10	270	16	92	19	4	54	46	0,5	1,1	0,07	1
50	37	.0050.370.0	151	10	270	16	92	19	4	72	46	0,5	0,8	0,1	0,7
65	26	.0065.260.0	121	11	290	16	107	20	4	45	69	0,7	1,9	0,1	2,1
65	37	.0065.370.0	162	12	290	16	107	20	4	80	69	0,7	1,8	0,2	1,9
80	25	.0080.250.0	132	12	305	16	122	20	5	55	89	0,9	3,8	0,1	4,4
80	36	.0080.360.0	162	13	305	16	122	20	5	88	89	0,9	2,4	0,2	2,8
100	26	.0100.260.0	142	15	330	16	147	22	6	60	138	1,4	4,9	0,2	7,8
100	36	.0100.360.0	182	16	330	16	147	22	6	96	138	1,4	3,1	0,4	4,9
125	25	.0125.250.0	162	18	350	16	178	22	7	70	184	1,8	6	0,4	11,0
125	34	.0125.340.0	202	19	350	16	178	22	7	112	184	1,8	3,8	0,6	6,9
150	23	.0150.230.0	173	23	380	16	208	24	9	75	264	2,6	15	0,6	31,0
150	36	.0150.360.0	233	24	380	16	208	24	9	135	264	2,6	8,4	1,0	17,0

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 10 ...

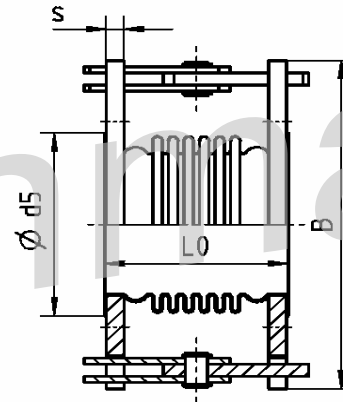


**PN 10**

Nominal diameter	Nominal angular movement absorption	Type  WBN 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_f$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	183	29	445	10	258	24	12	85	436	4	23	1,1	62
200	32	.0200.320.0	234	31	445	10	258	24	12	136	439	4	17	1,7	45
250	18	.0250.180.0	183	46	545	10	320	26	16	72	670	12	39	1,4	138
250	30	.0250.300.0	264	51	545	10	320	26	16	152	674	12	22	3,0	80
300	23	.0300.230.0	224	57	595	10	370	28	20	105	935	17	45	2,9	196
300	29	.0300.290.0	264	60	595	10	370	28	20	147	935	17	32	4,0	140
350	17	.0350.170.0	204	68	655	10	410	28	26	88	1113	20	78	2,8	328
350	26	.0350.260.0	274	73	655	10	410	28	26	154	1113	20	45	5,0	188
400	12	.0400.120.0	226	92	705	10	465	32	34	96	1466	26	297	4,1	706
400	26	.0400.260.0	376	108	705	10	465	32	34	240	1466	26	119	10,0	282
450	13	.0450.130.0	246	118	795	10	520	37	47	100	1844	33	362	5,4	964
450	25	.0450.250.0	366	133	795	10	520	37	47	225	1844	33	161	12,0	428

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 10 ...

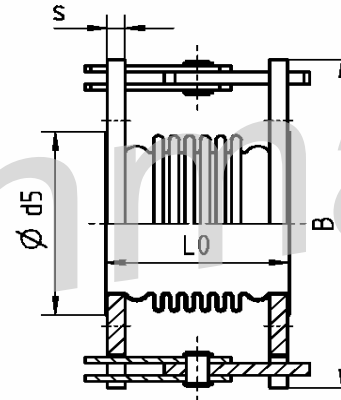


**PN 10**

Nominal diameter	Nominal angular movement absorption	Type  WBN 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_f$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	14	.0500.140.0	256	150	865	10	570	37	52	108	2273	55	395	7,1	1229
500	25	.0500.250.0	386	171	865	10	570	37	52	243	2273	55	176	16,0	546
600	12	.0600.120.0	276	196	975	10	670	43	72	116	3222	77	581	11,0	2027
600	23	.0600.230.0	416	222	975	10	670	43	72	261	3222	77	259	24,0	901

# Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 16 ...

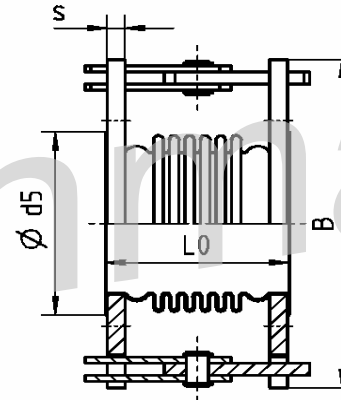


**PN 16**

Nominal diameter	Nominal angular movement absorption	Type  WBN 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	25	.0050.250.0	122	10	270	16	92	19	4	45	46	0,5	2,2	0,06	1,8
50	34	.0050.340.0	152	10	270	16	92	19	4	72	46	0,5	1,4	0,1	1,1
65	25	.0065.250.0	132	11	290	16	107	20	4	50	69	0,7	2,9	0,1	3
65	34	.0065.340.0	163	12	290	16	107	20	4	88	70	0,7	3,3	0,2	3,1
80	23	.0080.230.0	143	13	305	16	122	20	5	60	90	0,9	6,9	0,2	7,3
80	32	.0080.320.0	173	14	305	16	122	20	5	96	90	0,9	4,3	0,3	4,5
100	24	.0100.240.0	153	16	330	16	147	22	6	65	139	1,4	8,8	0,3	13
100	33	.0100.330.0	183	17	330	16	147	22	6	104	139	1,4	5,5	0,4	8
125	24	.0125.240.0	163	19	360	16	178	22	7	70	185	1,9	11	0,4	19
125	33	.0125.330.0	214	20	360	16	178	22	7	120	186	1,9	8,1	0,7	14
150	22	.0150.220.0	173	23	390	16	208	24	9	75	264	2,6	15	0,6	31
150	31	.0150.310.0	224	25	390	16	208	24	9	128	266	2,7	11	1,0	23

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 16 ...

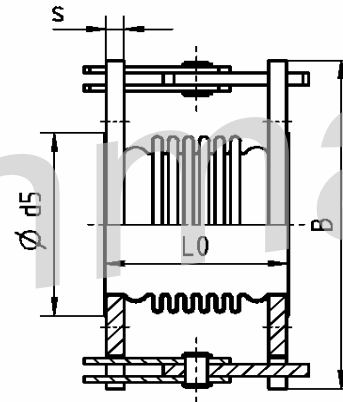


### PN 16

Nominal diameter	Nominal angular movement absorption	Type  WBN 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	195	43	495	16	258	26	14	90	441	8	38	1,2	96
200	31	.0200.310.0	245	46	495	16	258	26	14	144	441	8	24	1,8	60
250	14	.0250.140.0	214	53	545	16	320	29	19	95	674	12	96	1,9	143
250	23	.0250.230.0	285	60	545	16	320	29	19	171	677	12	67	3,4	99
300	15	.0300.150.0	235	76	595	16	375	37	28	105	940	17	147	2,9	269
300	22	.0300.220.0	325	83	595	16	375	37	28	189	940	17	82	5,2	150
350	12	.0350.120.0	215	98	695	16	410	37	41	84	1128	20	216	2,8	435
350	19	.0350.190.0	305	106	695	16	410	37	41	168	1128	20	108	5,5	217

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 25 ...

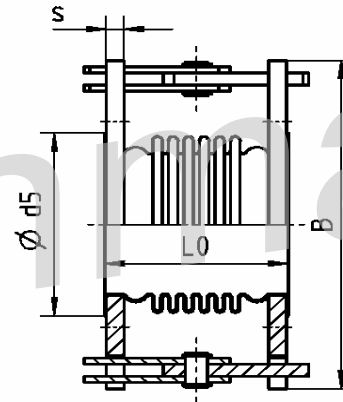


**PN 25**

Nominal diameter	Nominal angular movement absorption	Type  WBN 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	22	.0050.220.0	133	11	270	40	92	20	4	50	47	0,5	4,2	0,1	2,9
50	30	.0050.300.0	163	11	270	40	92	20	4	80	47	0,5	2,6	0,1	1,8
65	23	.0065.230.0	143	13	290	40	107	22	5	55	70	0,7	5,3	0,1	5
65	30	.0065.300.0	173	14	290	40	107	22	5	88	70	0,7	3,3	0,2	3,1
80	22	.0080.220.0	144	15	305	40	122	24	6	60	91	0,9	8,3	0,2	8,6
80	28	.0080.280.0	174	16	305	40	122	24	6	84	91	0,9	5,9	0,2	6,2
100	22	.0100.220.0	154	19	335	40	147	24	7	65	140	1,4	11	0,3	15
100	27	.0100.270.0	184	19	335	40	147	24	7	91	140	1,4	7,5	0,4	11
125	22	.0125.220.0	185	24	360	40	178	26	9	80	187	1,9	19	0,4	29
125	29	.0125.290.0	235	25	360	40	178	26	9	128	187	1,9	12	0,7	18
150	20	.0150.200.0	185	41	455	40	208	28	14	80	267	4,8	26	0,6	49
150	27	.0150.270.0	235	43	455	40	208	28	14	128	267	4,8	16	1,0	31

## Angular expansion joints with swivel lap-joint flanges

Single hinge version      Type WBN 25 ...



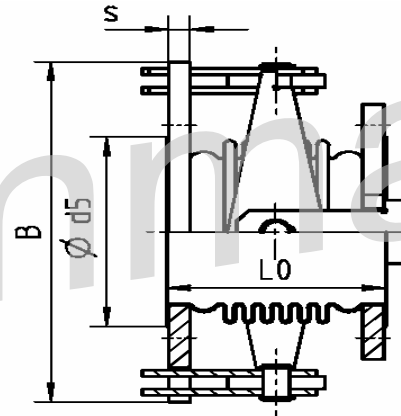
### PN 25

Nominal diameter	Nominal angular movement absorption	Type  WBN 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	14	.0200.140.0	205	52	495	25	258	32	19	90	443	8	84	1,2	99
200	22	.0200.220.0	276	58	495	25	258	32	19	162	445	8	57	2,1	66
250	14	.0250.140.0	236	73	560	25	320	37	27	100	679	12	147	2,0	212
250	20	.0250.200.0	296	78	560	25	320	37	27	160	679	12	92	3,2	133
300	14	.0300.140.0	256	121	665	25	375	43	42	110	940	23	188	3,0	325
300	19	.0300.190.0	346	131	665	25	375	43	42	198	940	23	104	5,4	181
350	11	.0350.110.0	258	163	745	25	410	47	61	96	1140	27	343	3,2	668
350	18	.0350.180.0	328	173	745	25	410	47	61	168	1140	27	196	5,6	382



## Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 06 ...

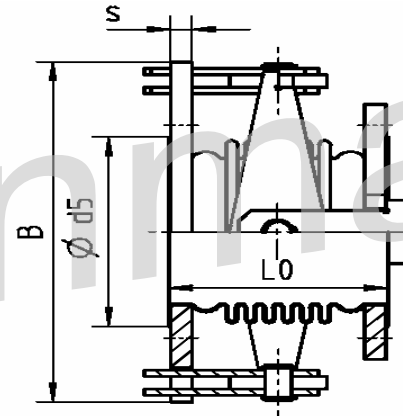


PN 6

Nominal diameter	Nominal angular movement absorption	Type  WBK 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	33	.0050.330.0	121	11	245	6	90	16	2,4	54	46	0,5	1,1	0,07	1
50	41	.0050.410.0	141	11	245	6	90	16	2	72	46	0,5	0,8	0,1	0,7
65	27	.0065.270.0	111	13	280	6	107	16	3	45	69	0,7	1,9	0,1	2,1
65	39	.0065.390.0	141	13	280	6	107	16	3	72	69	0,7	1,2	0,1	1,3
80	27	.0080.270.0	121	16	305	6	122	18	4	50	89	0,9	2,3	0,1	2,9
80	38	.0080.380.0	151	17	305	6	122	18	4	80	89	0,9	1,5	0,2	1,8
100	27	.0100.270.0	131	17	320	6	147	18	5	55	137	1,4	3,3	0,2	5,3
100	38	.0100.380.0	161	18	320	6	147	18	5	88	137	1,4	2,1	0,4	3,3
125	30	.0125.300.0	151	21	350	6	178	20	6	65	187	1,9	3	0,4	6,9
125	39	.0125.390.0	181	22	350	6	178	20	6	91	187	1,9	2,1	0,5	4,9
150	23	.0150.230.0	162	23	365	6	202	20	7	70	263	2,6	8,5	0,5	19
150	36	.0150.360.0	212	24	365	6	202	20	7	126	263	2,6	4,7	1,0	11

## Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 06 ...

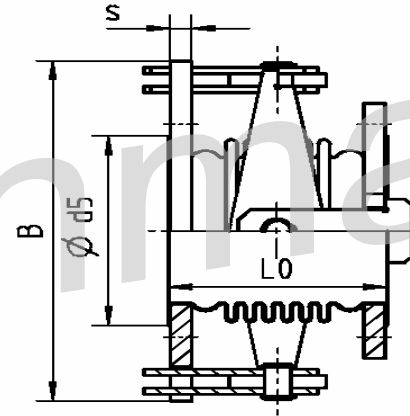


PN 6

Nominal diameter	Nominal angular movement absorption	Type  WBK 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	23	.0200.230.0	172	33	420	6	258	22	9	80	434	4,3	13	1,0	38
200	34	.0200.340.0	233	35	420	6	258	22	9	136	436	4,4	15	1,7	39
250	18	.0250.180.0	183	40	470	6	312	24	12	72	670	6,7	39	1,4	138
250	32	.0250.320.0	253	42	470	6	312	24	12	144	670	6,7	20	2,8	69
300	34	.0300.340.0	263	59	560	6	365	24	15	160	932	9,3	24	4,3	104
350	34	.0350.340.0	314	101	655	6	365	26	23	198	1113	20	35	6,4	146
400	27	.0400.270.0	343	116	675	6	410	28	26	220	1456	26	58	9,3	143
450	24	.0450.240.0	333	134	735	6	410	28	29	207	1828	33	83	11,0	220
500	26	.0500.260.0	354	159	795	6	465	28	32	225	2265	41	116	15,0	369
600	25	.0600.250.0	394	290	965	6	465	37	55	252	3217	77	164	24,0	597
700	25	.0700.250.0	446	383	1065	6	520	37	62	300	4342	104	308	38,0	1225
800	23	.0800.230.0	496	501	1185	6	520	43	87	330	5621	135	401	54,0	1740

# Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 10 ...

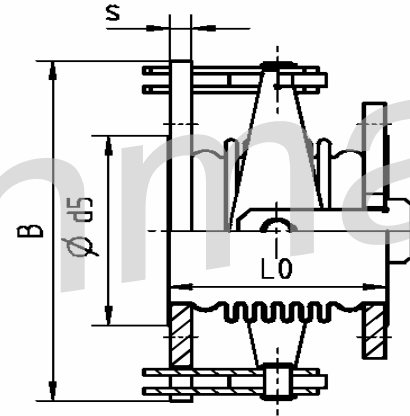


**PN 10**

Nominal diameter	Nominal angular movement absorption	Type  WBK 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	31	.0050.310.0	131	14	270	16	92	19	3,8	54	46	0,5	1,1	0,07	1
50	37	.0050.370.0	151	14	270	16	92	19	4	72	46	0,5	0,8	0,1	0,7
65	26	.0065.260.0	121	16	290	16	107	20	4	45	69	0,7	1,9	0,1	2,1
65	37	.0065.370.0	162	16	290	16	107	20	4	80	69	0,7	1,8	0,2	1,9
80	25	.0080.250.0	132	18	305	16	122	20	5	55	89	0,9	3,8	0,1	4,4
80	36	.0080.360.0	162	18	305	16	122	20	5	88	89	0,9	2,4	0,2	2,8
100	26	.0100.260.0	142	21	330	16	147	22	6	60	138	1,4	4,9	0,2	7,8
100	36	.0100.360.0	182	22	330	16	147	22	6	96	138	1,4	3,1	0,4	4,9
125	25	.0125.250.0	162	23	350	16	178	22	7	70	184	1,8	6	0,4	11,0
125	34	.0125.340.0	202	25	350	16	178	22	7	112	184	1,8	3,8	0,6	6,9
150	23	.0150.230.0	173	32	380	16	208	24	9	75	264	2,6	15	0,6	31,0
150	36	.0150.360.0	233	34	380	16	208	24	9	135	264	2,6	8,4	1,0	17,0

## Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 10 ...

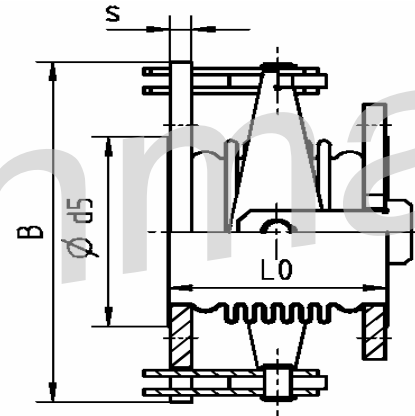


### PN 10

Nominal diameter	Nominal angular movement absorption	Type  WBK 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	183	40	445	10	258	24	12	85	436	4	23	1,1	62
200	32	.0200.320.0	234	42	445	10	258	24	12	136	439	4	17	1,7	45
250	18	.0250.180.0	183	70	545	10	320	26	16	72	670	12	39	1,4	138
250	30	.0250.300.0	264	75	545	10	320	26	16	152	674	12	22	3,0	80
300	29	.0300.290.0	264	91	595	10	370	28	20	147	935	17	32	4,0	140
350	26	.0350.260.0	274	113	655	10	370	28	26	154	1113	20	45	5,0	188
400	26	.0400.260.0	376	162	705	10	410	32	34	240	1466	26	119	10,0	282
450	25	.0450.250.0	366	204	795	10	410	37	47	225	1844	33	161	12,0	428
500	25	.0500.250.0	386	274	865	10	465	37	52	243	2273	55	176	16,0	546
600	23	.0600.230.0	416	378	975	10	465	43	72	261	3222	77	259	24,0	901

## Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 16 ...

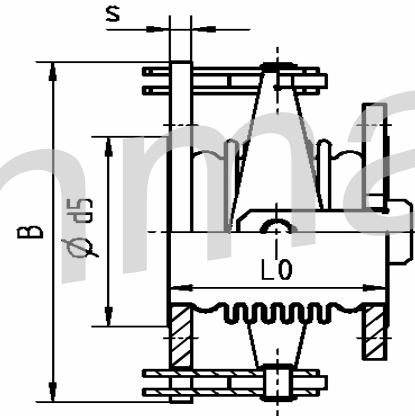


### PN 16

Nominal diameter	Nominal angular movement absorption	Type  WBK 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	25	.0050.250.0	122	15	270	16	92	19	3,8	45	46	0,5	2,2	0,06	1,8
50	34	.0050.340.0	152	15	270	16	92	19	4	72	46	0,5	1,4	0,1	1,1
65	25	.0065.250.0	132	16	290	16	107	20	4	50	69	0,7	2,9	0,1	3
65	34	.0065.340.0	163	17	290	16	107	20	4	88	70	0,7	3,3	0,2	3,1
80	23	.0080.230.0	143	18	305	16	122	20	5	60	90	0,9	6,9	0,2	7,3
80	32	.0080.320.0	173	19	305	16	122	20	5	96	90	0,9	4,3	0,3	4,5
100	24	.0100.240.0	153	23	330	16	147	22	6	65	139	1,4	8,8	0,3	13
100	33	.0100.330.0	183	24	330	16	147	22	6	104	139	1,4	5,5	0,4	8
125	24	.0125.240.0	163	27	360	16	178	22	7	70	185	1,9	11	0,4	19
125	33	.0125.330.0	214	29	360	16	178	22	7	120	186	1,9	8,1	0,7	14
150	22	.0150.220.0	173	33	390	16	208	24	9	75	264	2,6	15	0,6	31
150	31	.0150.310.0	224	34	390	16	208	24	9	128	266	2,7	11	1,0	23

## Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 16 ...

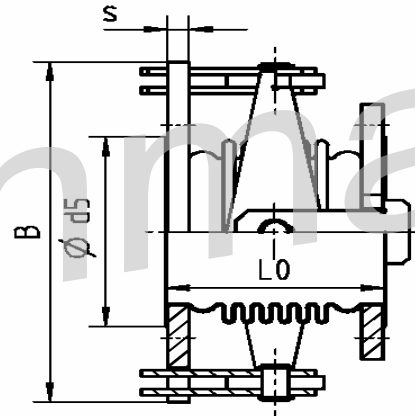


### PN 16

Nominal diameter	Nominal angular movement absorption	Type  WBK 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	195	64	495	16	258	26	14	90	441	8	38	1,2	96
200	31	.0200.310.0	245	67	495	16	258	26	14	144	441	8	24	1,8	60
250	14	.0250.140.0	214	82	545	16	320	29	19	95	674	12	96	1,9	143
250	23	.0250.230.0	285	89	545	16	320	29	19	171	677	12	67	3,4	99
300	22	.0300.220.0	325	123	595	16	375	37	28	189	940	17	82	5,2	150
350	19	.0350.190.0	305	161	695	16	375	37	41	168	1128	20	108	5,5	217

## Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 25 ...

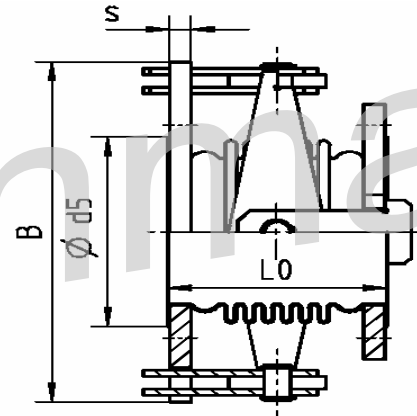


**PN 25**

Nominal diameter	Nominal angular movement absorption	Type  WBK 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	22	.0050.220.0	133	15	270	40	92	20	4	50	46,6	0,5	4,2	0,1	2,9
50	30	.0050.300.0	163	15	270	40	92	20	4	80	47	0,5	2,6	0,1	1,8
65	23	.0065.230.0	143	18	290	40	107	22	5	55	70	0,7	5,3	0,1	5
65	30	.0065.300.0	173	19	290	40	107	22	5	88	70	0,7	3,3	0,2	3,1
80	22	.0080.220.0	144	22	305	40	122	24	6	60	91	0,9	8,3	0,2	8,6
80	28	.0080.280.0	174	23	305	40	122	24	6	84	91	0,9	5,9	0,2	6,2
100	22	.0100.220.0	154	27	335	40	147	24	7	65	140	1,4	11	0,3	15
100	27	.0100.270.0	184	28	335	40	147	24	7	91	140	1,4	7,5	0,4	11
125	22	.0125.220.0	185	33	360	40	178	26	9	80	187	1,9	19	0,4	29
125	29	.0125.290.0	235	34	360	40	178	26	9	128	187	1,9	12	0,7	18
150	20	.0150.200.0	185	59	455	40	208	28	14	80	267	4,8	26	0,6	49
150	27	.0150.270.0	235	61	455	40	208	28	14	128	267	4,8	16	1,0	31

## Angular expansion joints with swivel lap-joint flanges

Gimbal hinge version      Type WBK 25 ...



**PN 25**

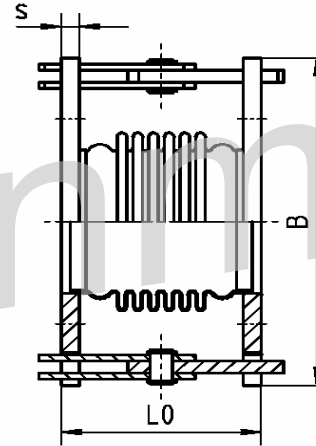
Nominal diameter	Nominal angular movement absorption	Type  WBK 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	d5	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	14	.0200.140.0	205	78	495	25	258	32	19	90	443	8	84	1,2	99
200	22	.0200.220.0	276	84	495	25	258	32	19	162	445	8	57	2,1	66
250	20	.0250.200.0	296	118	560	25	320	37	27	160	679	12	92	3,2	133
300	19	.0300.190.0	346	204	665	25	320	43	42	198	940	23	104	5,4	181
350	18	.0350.180.0	328	266	745	25	375	47	61	168	1140	27	196	5,6	382



## Angular expansion joints with plain fixed flanges

Single hinge version

Type WFN 06 ...



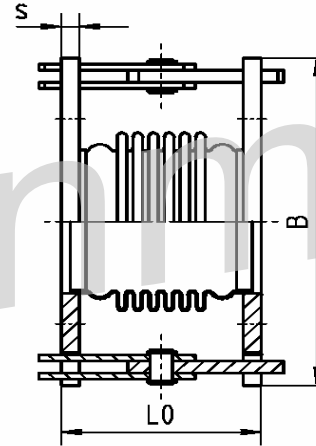
PN 6

Nominal diameter	Nominal angular movement absorption	Type  WFN 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	33	.0050.330.0	140	7	245	6	16	2,4	54	46	0,5	1,1	0,07	1
50	41	.0050.410.0	160	7	245	6	16	2,4	72	46	0,5	0,8	0,1	0,7
65	27	.0065.270.0	130	8	280	6	16	3,1	45	68,7	0,7	1,9	0,09	2,1
65	39	.0065.390.0	160	9	280	6	16	3,1	72	68,7	0,7	1,2	0,1	1,3
80	27	.0080.270.0	140	11	305	6	18	4,4	50	89,1	0,9	2,3	0,1	2,9
80	38	.0080.380.0	170	12	305	6	18	4,4	80	89,1	0,9	1,5	0,2	1,8
100	27	.0100.270.0	140	12	320	6	18	4,7	55	137	1,4	3,3	0,2	5,3
100	38	.0100.380.0	170	13	320	6	18	4,7	88	137	1,4	2,1	0,4	3,3
125	30	.0125.300.0	160	15	350	6	20	6,2	65	187	1,9	3	0,4	6,9
125	39	.0125.390.0	190	16	350	6	20	6,2	91	187	1,9	2,1	0,5	4,9
150	23	.0150.230.0	170	17	365	6	20	6,5	70	263	2,6	8,5	0,5	19
150	36	.0150.360.0	220	17	365	6	20	6,5	126	263	2,6	4,7	1	11

## Angular expansion joints with plain fixed flanges

Single hinge version

Type WFN 06 ...



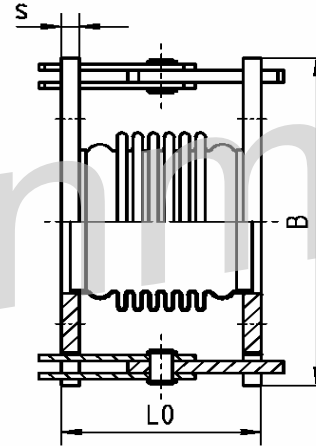
PN 6

Nominal diameter	Nominal angular movement absorption	Type  WFN 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
200	23	.0200.230.0	180	22	420	6	22	8,9	80	434	4,3	13	1	38
200	34	.0200.340.0	240	24	420	6	22	8,9	136	436	4,4	15	1,7	39
250	18	.0250.180.0	180	28	470	6	24	12	72	670	6,7	39	1,4	138
250	32	.0250.320.0	260	31	470	6	24	12	144	670	6,7	20	2,8	69
300	19	.0300.190.0	190	37	560	6	24	15	80	932	9,3	47	2,2	207
300	34	.0300.340.0	270	41	560	6	24	15	160	932	9,3	24	4,3	104
350	18	.0350.180.0	200	59	655	6	26	23	84	1110	20	65	2,7	278
350	34	.0350.340.0	310	68	655	6	26	23	198	1113	20	35	6,4	146
400	13	.0400.130.0	210	66	675	6	28	26	88	1456	26	146	3,7	359
400	27	.0400.270.0	340	76	675	6	28	26	220	1456	26	58	9,3	143
450	13	.0450.130.0	210	74	735	6	28	29	92	1828	33	186	4,9	496
450	24	.0450.240.0	330	83	735	6	28	29	207	1828	33	83	11	220

## Angular expansion joints with plain fixed flanges

Single hinge version

Type WFN 06 ...

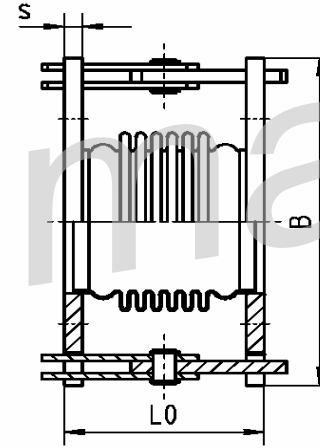


PN 6

Nominal diameter	Nominal angular movement absorption	Type  WFN 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
500	14	.0500.140.0	220	83	795	6	28	32	100	2265	41	260	6,6	831
500	26	.0500.260.0	350	96	795	6	28	32	225	2265	41	116	15	369
600	13	.0600.130.0	250	152	965	6	37	55	112	3217	77	370	10	1344
600	25	.0600.250.0	390	171	965	6	37	55	252	3217	77	164	24	597
700	14	.0700.140.0	280	172	1065	6	37	62	140	4324	104	422	18	1673
700	25	.0700.250.0	440	214	1065	6	37	62	300	4342	104	308	38	1225
800	11	.0800.110.0	290	234	1185	6	43	87	132	5621	135	1002	22	4350
800	23	.0800.230.0	490	278	1185	6	43	87	330	5621	135	401	54	1740

## Angular expansion joints with plain fixed flanges

Single hinge version      Type WFN 10 ...

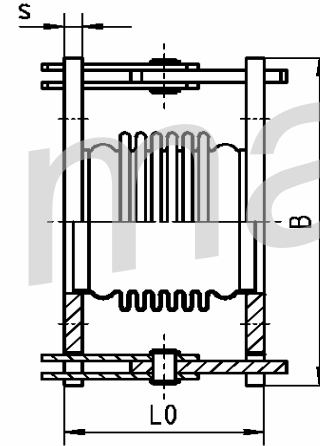


PN 10

Nominal diameter	Nominal angular movement absorption	Type  WFN 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	31	.0050.310.0	140	10	270	16	19	3,8	54	46	0,5	1,1	0,1	1,0
50	37	.0050.370.0	160	10	270	16	19	3,8	72	46	0,5	0,8	0,1	0,7
65	26	.0065.260.0	130	11	290	16	20	4,4	45	69	0,7	1,9	0,1	2,1
65	37	.0065.370.0	170	12	290	16	20	4,4	80	69	0,7	1,8	0,2	1,9
80	25	.0080.250.0	140	12	305	16	20	4,9	55	89	0,9	3,8	0,1	4,4
80	36	.0080.360.0	180	13	305	16	20	4,9	88	89	0,9	2,4	0,2	2,8
100	26	.0100.260.0	150	15	330	16	22	6,1	60	138	1,4	4,9	0,2	7,8
100	36	.0100.360.0	190	16	330	16	22	6,1	96	138	1,4	3,1	0,4	4,9
125	25	.0125.250.0	170	18	350	16	22	7,2	70	184	1,8	6	0,4	11,0
125	34	.0125.340.0	210	18	350	16	22	7,2	112	184	1,8	3,8	0,6	6,9
150	23	.0150.230.0	180	23	380	16	24	9,1	75	264	2,6	15	0,6	31,0
150	36	.0150.360.0	240	24	380	16	24	9,1	135	264	2,6	8,4	1,0	17,0

## Angular expansion joints with plain fixed flanges

Single hinge version      Type WFN 10 ...



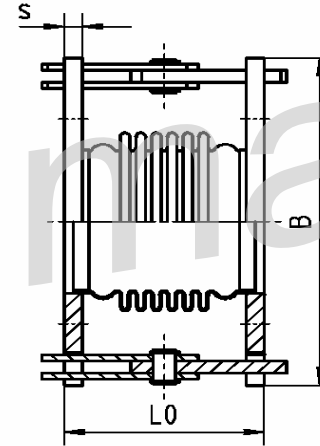
PN 10

Nominal diameter	Nominal angular movement absorption	Type  WFN 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	190	28	445	10	24	12	85	436	4	23	1,1	62
200	32	.0200.320.0	240	30	445	10	24	12	136	439	4	17	1,7	45
250	18	.0250.180.0	190	45	545	10	26	16	72	670	12	39	1,4	138
250	30	.0250.300.0	270	51	545	10	26	16	152	674	12	22	3,0	80
300	23	.0300.230.0	220	56	595	10	28	20	105	935	17	45	2,9	196
300	29	.0300.290.0	260	58	595	10	28	20	147	935	17	32	4,0	140
350	17	.0350.170.0	200	67	655	10	28	26	88	1113	20	78	2,8	328
350	26	.0350.260.0	270	72	655	10	28	26	154	1113	20	45	5,0	188
400	12	.0400.120.0	220	89	705	10	32	34	96	1466	26	297	4,1	706
400	26	.0400.260.0	370	105	705	10	32	34	240	1466	26	119	10,0	282
450	13	.0450.130.0	240	114	795	10	37	47	100	1844	33	362	5,4	964
450	25	.0450.250.0	360	129	795	10	37	47	225	1844	33	161	12,0	428

## Angular expansion joints with plain fixed flanges

Single hinge version

Type WFN 10 ...



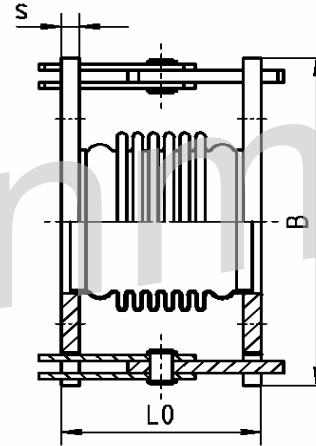
PN 10

Nominal diameter	Nominal angular movement absorption	Type  WFN 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	14	.0500.140.0	250	146	865	10	37	52	108	2273	55	395	7,1	1229
500	25	.0500.250.0	380	167	865	10	37	52	243	2273	55	176	16,0	546
600	12	.0600.120.0	270	191	975	10	43	72	116	3222	77	581	11,0	2027
600	23	.0600.230.0	410	217	975	10	43	72	261	3222	77	259	24,0	901

## Angular expansion joints with plain fixed flanges

Single hinge version

Type WFN 16 ...

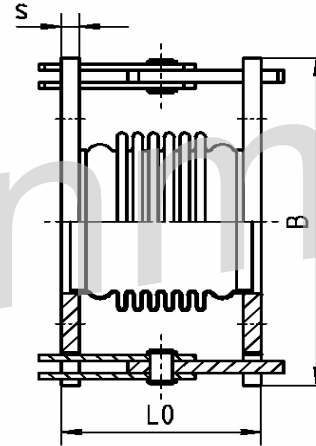


PN 16

Nominal diameter	Nominal angular movement absorption	Type  WFN 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	25	.0050.250.0	130	10	270	16	19	3,8	45	46	0,5	2,2	0,1	1,8
50	34	.0050.340.0	160	10	270	16	19	3,8	72	46	0,5	1,4	0,1	1,1
65	25	.0065.250.0	140	11	290	16	20	4,4	50	69	0,7	2,9	0,1	3
65	34	.0065.340.0	180	12	290	16	20	4,4	88	70	0,7	3,3	0,2	3,1
80	23	.0080.230.0	150	13	305	16	20	4,9	60	90	0,9	6,9	0,2	7,3
80	32	.0080.320.0	180	13	305	16	20	4,9	96	90	0,9	4,3	0,3	4,5
100	24	.0100.240.0	160	15	330	16	22	6,1	65	139	1,4	8,8	0,3	13
100	33	.0100.330.0	190	16	330	16	22	6,1	104	139	1,4	5,5	0,4	8
125	24	.0125.240.0	170	19	360	16	22	7,4	70	185	1,9	11	0,4	19
125	33	.0125.330.0	220	20	360	16	22	7,4	120	186	1,9	8,1	0,7	14
150	22	.0150.220.0	180	23	390	16	24	9,3	75	264	2,6	15	0,6	31
150	31	.0150.310.0	230	25	390	16	24	9,3	128	266	2,7	11	1,0	23

## Angular expansion joints with plain fixed flanges

Single hinge version      Type WFN 16 ...



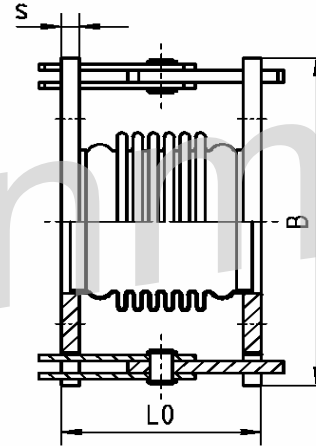
**PN 16**

Nominal diameter	Nominal angular movement absorption	Type  WFN 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	190	42	495	16	26	14	90	441	8	38	1,2	96
200	31	.0200.310.0	250	45	495	16	26	14	144	441	8	24	1,8	60
250	14	.0250.140.0	210	52	545	16	29	19	95	674	12	96	1,9	143
250	23	.0250.230.0	280	59	545	16	29	19	171	677	12	67	3,4	99
300	15	.0300.150.0	230	74	595	16	37	28	105	940	17	147	2,9	269
300	22	.0300.220.0	320	81	595	16	37	28	189	940	17	82	5,2	150
350	12	.0350.120.0	210	95	695	16	37	41	84	1128	20	216	2,8	435
350	19	.0350.190.0	300	103	695	16	37	41	168	1128	20	108	5,5	217



## Angular expansion joints with plain fixed flanges

Single hinge version      Type WFN 25 ...

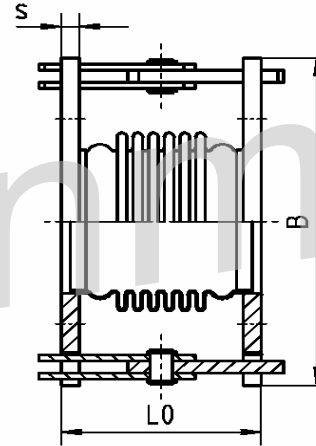


### PN 25

Nominal diameter	Nominal angular movement absorption	Type  WFN 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	22	.0050.220.0	140	10	270	40	20	4,0	50	47	0,5	4,2	0,1	2,9
50	30	.0050.300.0	170	11	270	40	20	4,0	80	47	0,5	2,6	0,1	1,8
65	23	.0065.230.0	150	13	290	40	22	4,9	55	70	0,7	5,3	0,1	5
65	30	.0065.300.0	180	13	290	40	22	4,9	88	70	0,7	3,3	0,2	3,1
80	22	.0080.220.0	150	15	305	40	24	5,9	60	91	0,9	8,3	0,2	8,6
80	28	.0080.280.0	180	16	305	40	24	5,9	84	91	0,9	5,9	0,2	6,2
100	22	.0100.220.0	160	18	335	40	24	7,2	65	140	1,4	11	0,3	15
100	27	.0100.270.0	180	19	335	40	24	7,2	91	140	1,4	7,5	0,4	11
125	22	.0125.220.0	180	23	360	40	26	9,3	80	187	1,9	19	0,4	29
125	29	.0125.290.0	230	25	360	40	26	9,3	128	187	1,9	12	0,7	18
150	20	.0150.200.0	180	40	455	40	28	14	80	267	4,8	26	0,6	49
150	27	.0150.270.0	230	43	455	40	28	14	128	267	4,8	16	1,0	31

## Angular expansion joints with plain fixed flanges

Single hinge version      Type WFN 25 ...

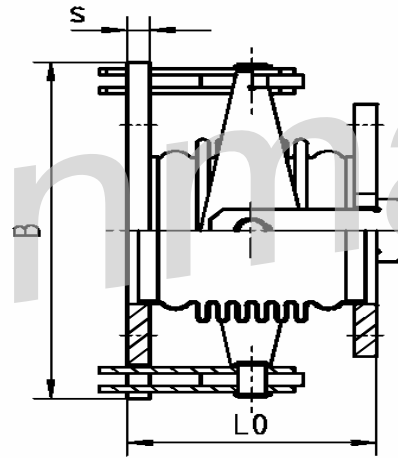


**PN 25**

Nominal diameter	Nominal angular movement absorption	Type  WFN 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	14	.0200.140.0	200	51	495	25	32	19	90	443	8	84	1,2	99
200	22	.0200.220.0	270	57	495	25	32	19	162	445	8	57	2,1	66
250	14	.0250.140.0	230	72	560	25	37	27	100	679	12	147	2,0	212
250	20	.0250.200.0	290	76	560	25	37	27	160	679	12	92	3,2	133
300	14	.0300.140.0	250	118	665	25	43	42	110	940	23	188	3,0	325
300	19	.0300.190.0	340	128	665	25	43	42	198	940	23	104	5,4	181
350	11	.0350.110.0	250	159	745	25	47	61	96	1140	27	343	3,2	668
350	18	.0350.180.0	320	169	745	25	47	61	168	1140	27	196	5,6	382

## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 06 ...

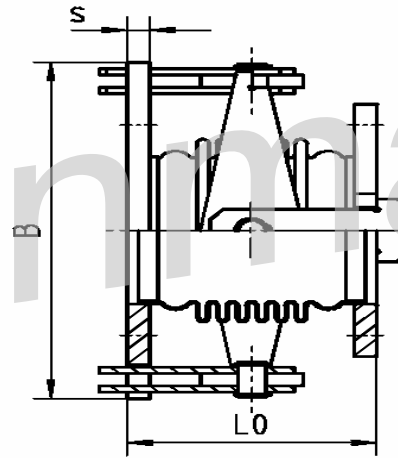


PN 6

Nominal diameter	Nominal angular movement absorption	Type  WFK 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	33	.0050.330.0	140	11	245	6	16	2,4	54	46	0,5	1,1	0,07	1
50	41	.0050.410.0	160	11	245	6	16	2,4	72	46	0,5	0,8	0,1	0,7
65	27	.0065.270.0	130	13	280	6	16	3,1	45	68,7	0,7	1,9	0,09	2,1
65	39	.0065.390.0	160	13	280	6	16	3,1	72	68,7	0,7	1,2	0,1	1,3
80	27	.0080.270.0	140	16	305	6	18	4,4	50	89,1	0,9	2,3	0,1	2,9
80	38	.0080.380.0	170	17	305	6	18	4,4	80	89,1	0,9	1,5	0,2	1,8
100	27	.0100.270.0	140	17	320	6	18	4,7	55	137	1,4	3,3	0,2	5,3
100	38	.0100.380.0	170	18	320	6	18	4,7	88	137	1,4	2,1	0,4	3,3
125	30	.0125.300.0	160	21	350	6	20	6,2	65	187	1,9	3	0,4	6,9
125	39	.0125.390.0	190	22	350	6	20	6,2	91	187	1,9	2,1	0,5	4,9
150	23	.0150.230.0	170	23	365	6	20	6,5	70	263	2,6	8,5	0,5	19
150	36	.0150.360.0	220	24	365	6	20	6,5	126	263	2,6	4,7	1	11

## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 06 ...

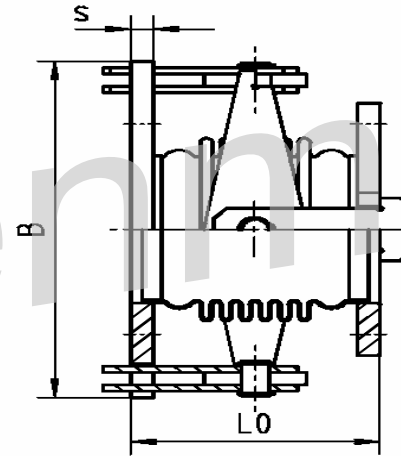


PN 6

Nominal diameter	Nominal angular movement absorption	Type  WFK 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
200	23	.0200.230.0	180	32	420	6	22	8,9	80	434	4,3	13	1	38
200	34	.0200.340.0	240	35	420	6	22	8,9	136	436	4,4	15	1,7	39
250	18	.0250.180.0	180	40	470	6	24	11,5	72	670	6,7	39	1,4	138
250	32	.0250.320.0	260	42	470	6	24	11,5	144	670	6,7	20	2,8	69
300	34	.0300.340.0	270	59	560	6	24	15,4	160	932	9,3	24	4,3	104
350	34	.0350.340.0	310	100	655	6	26	22,6	198	1113	20	35	6,4	146
400	27	.0400.270.0	340	115	675	6	28	25,7	220	1456	26	58	9,3	143
450	24	.0450.240.0	330	133	735	6	28	29,2	207	1828	33	83	11	220
500	26	.0500.260.0	350	157	795	6	28	31,7	225	2265	41	116	15	369
600	25	.0600.250.0	390	287	965	6	37	54,6	252	3217	77	164	24	597
700	25	.0700.250.0	440	378	1065	6	37	62,1	300	4342	104	308	38	1225
800	23	.0800.230.0	490	494	1185	6	43	87,2	330	5621	135	401	54	1740

## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 10 ...

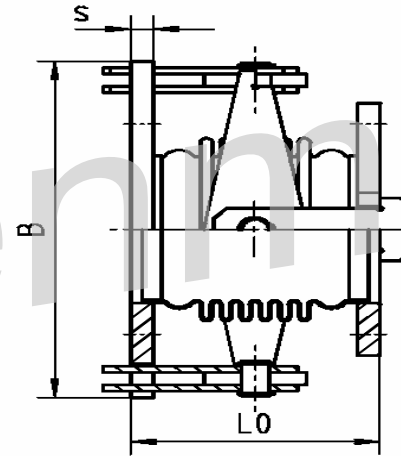


PN 10

Nominal diameter	Nominal angular movement absorption	Type  WFK 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	31	.0050.310.0	140	14	270	16	19	4	54	46	0,5	1,1	0,1	1,0
50	37	.0050.370.0	160	14	270	16	19	4	72	46	0,5	0,8	0,1	0,7
65	26	.0065.260.0	130	16	290	16	20	4	45	69	0,7	1,9	0,1	2,1
65	37	.0065.370.0	170	17	290	16	20	4	80	69	0,7	1,8	0,2	1,9
80	25	.0080.250.0	140	17	305	16	20	5	55	89	0,9	3,8	0,1	4,4
80	36	.0080.360.0	180	18	305	16	20	5	88	89	0,9	2,4	0,2	2,8
100	26	.0100.260.0	150	20	330	16	22	6	60	138	1,4	4,9	0,2	7,8
100	36	.0100.360.0	190	22	330	16	22	6	96	138	1,4	3,1	0,4	4,9
125	25	.0125.250.0	170	24	350	16	22	7	70	184	1,8	6	0,4	11,0
125	34	.0125.340.0	210	24	350	16	22	7	112	184	1,8	3,8	0,6	6,9
150	23	.0150.230.0	180	32	380	16	24	9	75	264	2,6	15	0,6	31,0
150	36	.0150.360.0	240	33	380	16	24	9	135	264	2,6	8,4	1,0	17,0

## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 10 ...

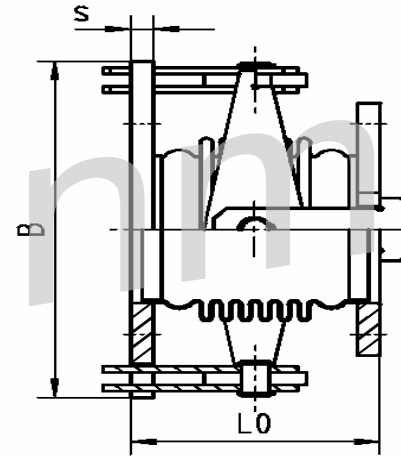


**PN 10**

Nominal diameter	Nominal angular movement absorption	Type  WFK 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	190	39	445	10	24	12	85	436	4	23	1,1	62
200	32	.0200.320.0	240	41	445	10	24	12	136	439	4	17	1,7	45
250	18	.0250.180.0	190	69	545	10	26	16	72	670	12	39	1,4	138
250	30	.0250.300.0	270	74	545	10	26	16	152	674	12	22	3,0	80
300	29	.0300.290.0	260	90	595	10	28	20	147	935	17	32	4,0	140
350	26	.0350.260.0	270	112	655	10	28	26	154	1113	20	45	5,0	188
400	26	.0400.260.0	370	159	705	10	32	34	240	1466	26	119	10,0	282
450	25	.0450.250.0	360	200	795	10	37	47	225	1844	33	161	12,0	428
500	25	.0500.250.0	380	270	865	10	37	52	243	2273	55	176	16,0	546
600	23	.0600.230.0	410	373	975	10	43	72	261	3222	77	259	24,0	901

## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 16 ...

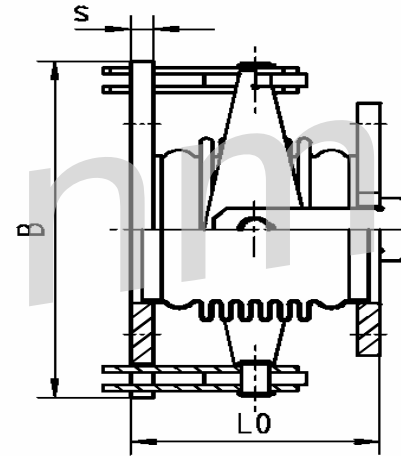


**PN 16**

Nominal diameter	Nominal angular movement absorption	Type  WFK 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>b</sub>	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	25	.0050.250.0	130	14	270	16	19	4	45	46	0,5	2,2	0,1	1,8
50	34	.0050.340.0	160	14	270	16	19	4	72	46	0,5	1,4	0,1	1,1
65	25	.0065.250.0	140	16	290	16	20	4	50	69	0,7	2,9	0,1	3
65	34	.0065.340.0	180	17	290	16	20	4	88	70	0,7	3,3	0,2	3,1
80	23	.0080.230.0	150	18	305	16	20	5	60	90	0,9	6,9	0,2	7,3
80	32	.0080.320.0	180	19	305	16	20	5	96	90	0,9	4,3	0,3	4,5
100	24	.0100.240.0	160	22	330	16	22	6	65	139	1,4	8,8	0,3	13
100	33	.0100.330.0	190	23	330	16	22	6	104	139	1,4	5,5	0,4	8
125	24	.0125.240.0	170	28	360	16	22	7	70	185	1,9	11	0,4	19
125	33	.0125.330.0	220	29	360	16	22	7	120	186	1,9	8,1	0,7	14
150	22	.0150.220.0	180	33	390	16	24	9	75	264	2,6	15	0,6	31
150	31	.0150.310.0	230	34	390	16	24	9	128	266	2,7	11	1,0	23

## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 16 ...



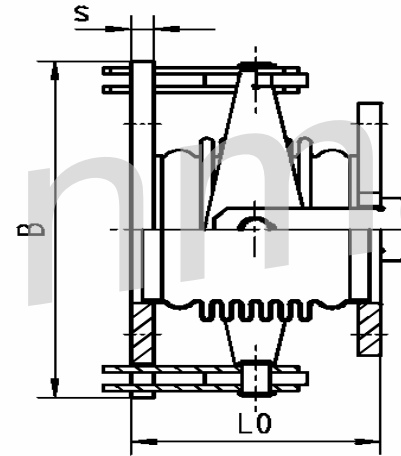
**PN 16**

Nominal diameter	Nominal angular movement absorption	Type  WFK 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	22	.0200.220.0	190	63	495	16	26	14	90	441	8	38	1,2	96
200	31	.0200.310.0	250	66	495	16	26	14	144	441	8	24	1,8	60
250	14	.0250.140.0	210	81	545	16	29	19	95	674	12	96	1,9	143
250	23	.0250.230.0	280	88	545	16	29	19	171	677	12	67	3,4	99
300	22	.0300.220.0	320	121	595	16	37	28	189	940	17	82	5,2	150
350	19	.0350.190.0	300	159	695	16	37	41	168	1128	20	108	5,5	217



## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 25 ...

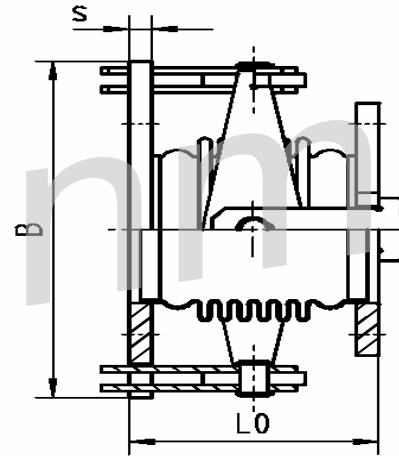


**PN 25**

Nominal diameter	Nominal angular movement absorption	Type  WFK 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	PN	s	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	22	.0050.220.0	140	15	270	40	20	4	50	47	0,5	4,2	0,1	2,9
50	30	.0050.300.0	170	16	270	40	20	4	80	47	0,5	2,6	0,1	1,8
65	23	.0065.230.0	150	17	290	40	22	5	55	70	0,7	5,3	0,1	5
65	30	.0065.300.0	180	18	290	40	22	5	88	70	0,7	3,3	0,2	3,1
80	22	.0080.220.0	150	21	305	40	24	6	60	91	0,9	8,3	0,2	8,6
80	28	.0080.280.0	180	22	305	40	24	6	84	91	0,9	5,9	0,2	6,2
100	22	.0100.220.0	160	26	335	40	24	7	65	140	1,4	11	0,3	15
100	27	.0100.270.0	180	27	335	40	24	7	91	140	1,4	7,5	0,4	11
125	22	.0125.220.0	180	32	360	40	26	9	80	187	1,9	19	0,4	29
125	29	.0125.290.0	230	33	360	40	26	9	128	187	1,9	12	0,7	18
150	20	.0150.200.0	180	58	455	40	28	14	80	267	4,8	26	0,6	49
150	27	.0150.270.0	230	61	455	40	28	14	128	267	4,8	16	1,0	31

## Angular expansion joints with plain fixed flanges

Gimbal hinge version      Type WFK 25 ...

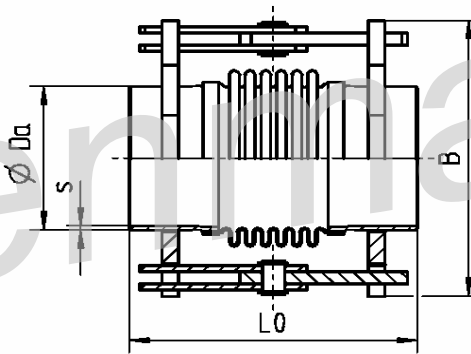


**PN 25**

Nominal diameter	Nominal angular movement absorption	Type  WFK 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	PN	s	G	lb	Ae	$c_f$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
200	14	.0200.140.0	200	77	495	25	32	19	90	443	8	84	1,2	99
200	22	.0200.220.0	270	83	495	25	32	19	162	445	8	57	2,1	66
250	20	.0250.200.0	290	116	560	25	37	27	160	679	12	92	3,2	133
300	19	.0300.190.0	340	202	665	25	43	42	198	940	23	104	5,4	181
350	18	.0350.180.0	320	262	745	25	47	61	168	1140	27	196	5,6	382

## Angular expansion joints with weld ends

Single hinge version      Typ WRN 02...

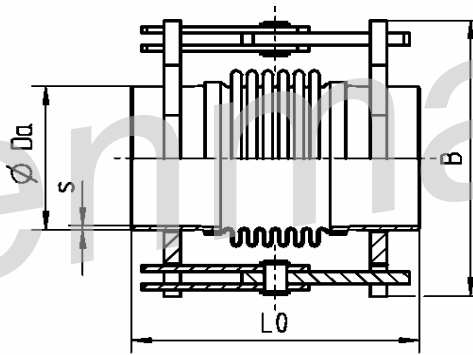


PN 2,5

Nominal diameter	Nominal angular movement absorption	Type  WRN 02 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
400	10	.0400.100.0	290	32	600	406,4	6	100	5,9	63	1445	14	142	2,6	331
400	20	.0400.200.0	350	35	600	406,4	6,0	100	5,9	126	1445,0	14	71	5,3	165
400	28	.0400.280.0	410	37	600	406,4	6,0	100	5,9	189	1445,0	14	47	7,9	110
450	10	.0450.099.0	290	37	660	457,0	6,0	100	6,6	66	1825,0	18	165	3,5	444
450	19	.0450.190.0	355	41	660	457,0	6,0	100	6,6	132	1825,0	18	82	7,0	222
450	26	.0450.260.0	420	43	660	457,0	6,0	100	6,6	198	1825,0	18	55	11,0	148
500	11	.0500.110.0	320	44	720	508,0	6,0	110	8,1	69	2252,0	23	179	4,5	569
500	20	.0500.200.0	385	48	720	508,0	6,0	110	8,1	138	2252,0	23	89	9,0	285
500	30	.0500.300.0	475	53	720	508,0	6,0	110	8,1	230	2252,0	23	54	15,0	171
600	10	.0600.100.0	345	64	820	610,0	6,0	120	10,7	78	3202,0	32	254	7,3	919
600	22	.0600.220.0	450	70	820	610,0	6,0	120	10,7	182	3202,0	32	109	17,0	394
600	29	.0600.290.0	550	76	820	610,0	6,0	120	10,7	286	3202,0	32	69	27,0	251

## Angular expansion joints with weld ends

Single hinge version      Typ WRN 02...

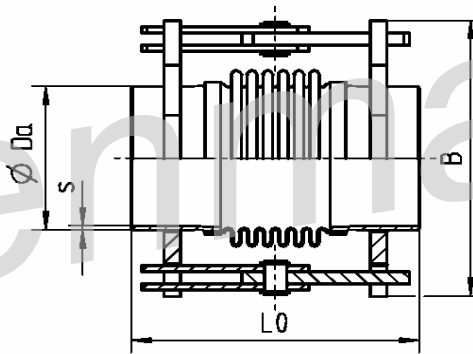


PN 2,5

Nominal diameter	Nominal angular movement absorption	Type  WRN 02 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
700	9	.0700.091.0	395	92	975	711,0	6,0	140	14,5	84	4324,0	78	326	11,0	1363
700	17	.0700.170.0	475	99	975	711,0	6,0	140	14,5	168	4324,0	78	162	21,0	681
700	25	.0700.250.0	615	110	975	711,0	6,0	140	14,5	308	4324,0	78	89	39,0	372
800	8	.0800.084.0	440	126	1085	813,0	6,0	160	19,0	87	5588,0	101	456	14,0	2003
800	18	.0800.180.0	555	136	1085	813,0	6,0	160	19,0	203	5588,0	101	196	33,0	858
800	26	.0800.260.0	670	156	1085	813,0	6,0	160	19,0	319	5595,0	101	186	52,0	819
900	7	.0900.074.0	445	146	1205	914,0	6,0	160	21,4	90	7133,0	128	628	19,0	2882
900	14	.0900.140.0	530	155	1205	914,0	6,0	160	21,4	180	7133,0	128	313	37,0	1441
900	20	.0900.200.0	680	169	1205	914,0	6,0	160	21,4	330	7133,0	128	170	68,0	786
1000	8	.1000.077.0	495	191	1315	1016,0	6,0	180	26,7	96	8750,0	157	814	24,0	3869
1000	14	.1000.140.0	590	200	1315	1016,0	6,0	180	26,7	192	8750,0	157	408	49,0	1935
1000	22	.1000.220.0	725	226	1315	1016,0	6,0	180	26,7	330	8758,0	158	367	84,0	1731

## Angular expansion joints with weld ends

Single hinge version      Typ WRN 02...

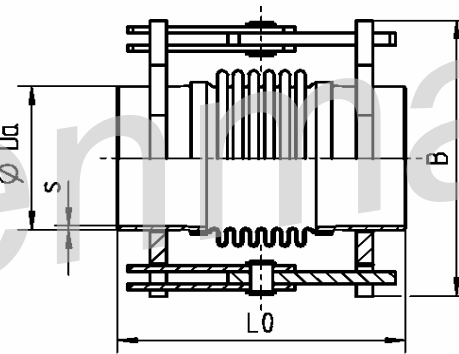


PN 2,5

Nominal diameter	Nominal angular movement absorption	Type  WRN 02 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
1200	7	.1200.065.0	535	284	1545	1220,0	8,0	200	47,5	96	12331,0	296	1750	34,0	9432
1200	12	.1200.120.0	630	302	1545	1220,0	8,0	200	47,5	192	12331,0	296	877	69,0	4716
1200	18	.1200.180.0	755	326	1545	1220,0	8,0	200	47,5	320	12331,0	296	524	115,0	2830
1400	4	.1400.040.0	565	396	1745	1420,0	8,0	225	62,3	116	16639,0	399	5560	56,0	14144
1400	8	.1400.077.0	680	416	1745	1420,0	8,0	225	62,3	233	16639,0	399	2782	113,0	7072
1400	12	.1400.120.0	850	469	1745	1420,0	8,0	225	62,3	402	16650,0	400	2516	195,0	6339
1600	4	.1600.035.0	565	523	1995	1620,0	8,0	225	71,1	116	21525,0	646	8156	73,0	21035
1600	7	.1600.068.0	680	549	1995	1620,0	8,0	225	71,1	233	21525,0	646	4078	146,0	10518
1600	11	.1600.110.0	835	584	1995	1620,0	8,0	225	71,1	388	21525,0	646	2446	243,0	6311
1800	3	.1800.031.0	565	575	2185	1820,0	8,0	225	79,9	116	27040,0	811	11440	92,0	29864
1800	6	.1800.061.0	680	603	2185	1820,0	8,0	225	79,9	233	27040,0	811	5724	183,0	14932
1800	10	.1800.095.0	835	640	2185	1820,0	8,0	225	79,9	388	27040,0	811	3433	305,0	8959

## Angular expansion joints with weld ends

Single hinge version      Typ WRN 02...



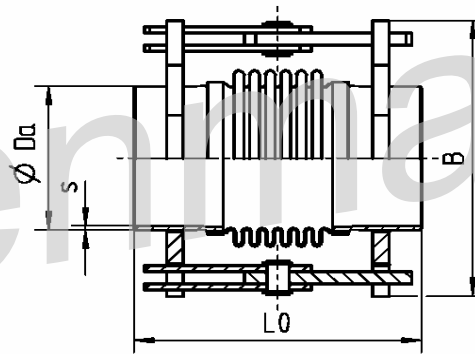
**PN 2,5**

Nominal diameter	Nominal angular movement absorption	Type  WRN 02 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	Da	s	L	G	lb	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
2000	3	.2000.028.0	615	773	2405	2020,0	8,0	250	98,6	116	33184,0	996	15513	112,0	40871
2000	6	.2000.055.0	730	803	2405	2020,0	8,0	250	98,6	233	33184,0	996	7752	225,0	20435
2000	9	.2000.086.0	885	843	2405	2020,0	8,0	250	98,6	388	33184,0	996	4655	375,0	12261

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 06...



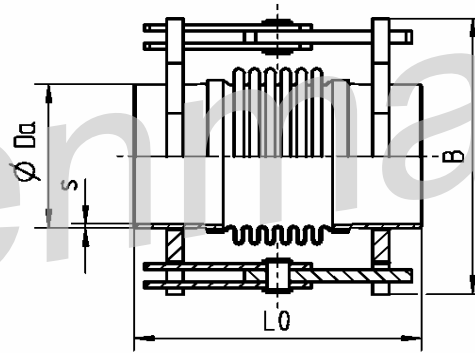
PN 6

Nominal diameter	Nominal angular movement absorption	Type  WRN 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	18	.0050.180.0	210	5	200	60,3	4	90	0,5	27	46	0,5	2,2	0,04	1,9
50	28	.0050.280.0	225	5	200	60,3	4,0	90	0,5	45	46,0	0,5	1,3	0,1	1,1
50	37	.0050.370.0	240	5	200	60,3	4,0	90	0,5	63	46,0	0,5	1	0,1	0,8
65	17	.0065.170.0	210	6	220	76,1	4,0	90	0,6	27	68,7	0,7	3,2	0,1	3,5
65	27	.0065.270.0	225	6	220	76,1	4,0	90	0,6	45	68,7	0,7	1,9	0,1	2,1
65	39	.0065.390.0	250	6	220	76,1	4,0	90	0,6	72	68,7	0,7	1,2	0,1	1,3
80	17	.0080.170.0	210	6	235	88,9	4,0	90	0,7	30	89,1	0,9	3,9	0,1	4,9
80	27	.0080.270.0	230	7	235	88,9	4,0	90	0,7	50	89,1	0,9	2,3	0,1	2,9
80	38	.0080.380.0	260	7	235	88,9	4,0	90	0,7	80	89,1	0,9	1,5	0,2	1,8
100	17	.0100.170.0	215	8	265	114,3	4,0	90	1,0	33	137,0	1,4	5,5	0,1	8,9
100	27	.0100.270.0	235	8	265	114,3	4,0	90	1,0	55	137,0	1,4	3,3	0,2	5,3
100	38	.0100.380.0	265	9	265	114,3	4,0	90	1,0	88	137,0	1,4	2,1	0,4	3,3

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 06...



PN 6

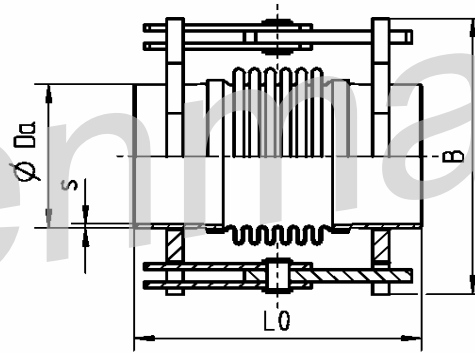
Nominal diameter	Nominal angular movement absorption	Type  WRN 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	19	.0125.190.0	235	9	290	139,7	4,0	90	1,2	39	187,0	1,9	5	0,2	11
125	30	.0125.300.0	260	9	290	139,7	4,0	90	1,2	65	187,0	1,9	3	0,4	6,9
125	39	.0125.390.0	285	10	290	139,7	4,0	90	1,2	91	187,0	1,9	2,1	0,5	4,9
150	15	.0150.150.0	240	11	325	168,3	4,5	90	1,6	42	263,0	2,6	14	0,3	32
150	27	.0150.270.0	280	12	325	168,3	4,5	90	1,6	84	263,0	2,6	7,2	0,6	16
150	36	.0150.360.0	320	12	325	168,3	4,5	90	1,6	126	263,0	2,6	4,7	1,0	11
200	14	.0200.140.0	270	20	385	219,1	6,3	100	3,3	48	434,0	4,3	22	0,6	63
200	29	.0200.290.0	330	21	385	219,1	6,3	100	3,3	112	434,0	4,3	9,5	1,4	27
200	40	.0200.400.0	390	24	385	219,1	6,3	100	3,3	170	436,0	4,4	12	2,2	31
250	14	.0250.140.0	275	27	450	273,0	7,1	100	4,6	54	670,0	6,7	52	1,1	184
250	22	.0250.220.0	310	28	450	273,0	7,1	100	4,6	90	670,0	6,7	31	1,8	110
250	32	.0250.320.0	365	30	450	273,0	7,1	100	4,6	144	670,0	6,7	20	2,8	69



## Angular expansion joints with weld ends

Single hinge version

Typ WRN 06...



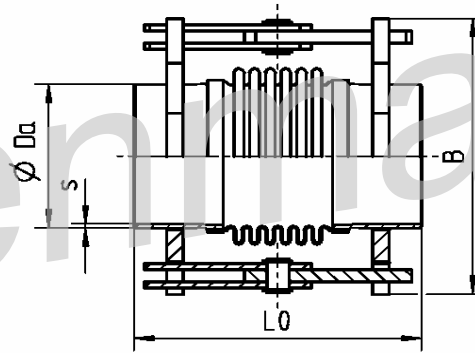
PN 6

Nominal diameter	Nominal angular movement absorption	Type  WRN 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	15	.0300.150.0	285	38	500	323,9	8,0	100	6,2	60	932,0	9,3	63	1,6	276
300	23	.0300.230.0	325	40	500	323,9	8,0	100	6,2	100	932,0	9,3	38	2,7	166
300	34	.0300.340.0	385	43	500	323,9	8,0	100	6,2	160	932,0	9,3	24	4,3	104
350	13	.0350.130.0	330	46	585	355,6	6,0	120	6,2	63	1110,0	20,0	87	2,0	371
350	25	.0350.250.0	390	49	585	355,6	6,0	120	6,2	126	1110,0	20,0	43	4,1	185
350	34	.0350.340.0	460	55	585	355,6	6,0	120	6,2	198	1113,0	20,0	35	6,4	146
400	10	.0400.100.0	350	60	645	406,4	6,0	130	7,7	66	1456,0	26,0	194	2,8	478
400	19	.0400.190.0	415	65	645	406,4	6,0	130	7,7	132	1456,0	26,0	97	5,6	239
400	27	.0400.270.0	500	71	645	406,4	6,0	130	7,7	220	1456,0	26,0	58	9,3	143
450	10	.0450.098.0	355	68	705	457,0	6,0	130	8,6	69	1828,0	33,0	248	3,7	661
450	18	.0450.180.0	420	74	705	457,0	6,0	130	8,6	138	1828,0	33,0	124	7,3	331
450	24	.0450.240.0	490	79	705	457,0	6,0	130	8,6	207	1828,0	33,0	83	11,0	220

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 06...



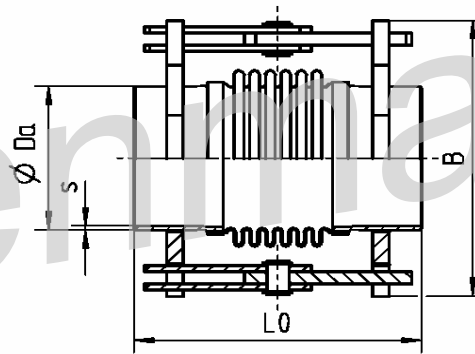
PN 6

Nominal diameter	Nominal angular movement absorption	Type  WRN 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	10	.0500.100.0	385	88	755	508,0	6,0	140	10,3	75	2265,0	41,0	347	4,9	1108
500	17	.0500.170.0	435	93	755	508,0	6,0	140	10,3	125	2265,0	41,0	208	8,2	665
500	26	.0500.260.0	530	103	755	508,0	6,0	140	10,3	225	2265,0	41,0	116	15,0	369
600	10	.0600.100.0	435	136	905	610,0	6,0	160	14,2	84	3217,0	77,0	493	7,9	1792
600	16	.0600.160.0	490	144	905	610,0	6,0	160	14,2	140	3217,0	77,0	296	13,0	1075
600	25	.0600.250.0	600	160	905	610,0	6,0	160	14,2	252	3217,0	77,0	164	24,0	597
700	9	.0700.091.0	475	195	1015	711,0	8,0	180	24,8	84	4324,0	104,0	703	11,0	2788
700	17	.0700.170.0	555	209	1015	711,0	8,0	180	24,8	168	4324,0	104,0	352	21,0	1394
700	24	.0700.240.0	655	238	1015	711,0	8,0	180	24,8	270	4342,0	104,0	341	34,0	1361
800	8	.0800.084.0	490	233	1125	813,0	8,0	180	28,4	99	5621,0	135,0	1337	16,0	5800
800	16	.0800.160.0	590	255	1125	813,0	8,0	180	28,4	198	5621,0	135,0	668	32,0	2900
800	23	.0800.230.0	720	284	1125	813,0	8,0	180	28,4	330	5621,0	135,0	401	54,0	1740

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 06...



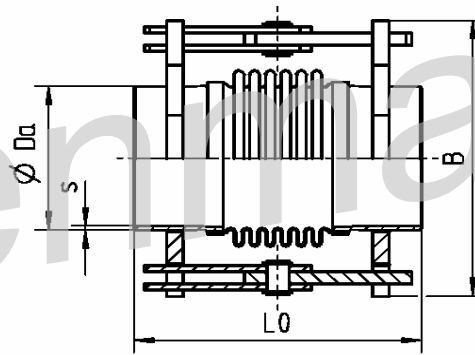
PN 6

Nominal diameter	Nominal angular movement absorption	Type  WRN 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
900	7	.0900.074.0	580	379	1285	914,0	8,0	225	40,0	99	7163,0	215,0	1896	21,0	8489
900	14	.0900.140.0	680	408	1285	914,0	8,0	225	40,0	198	7163,0	215,0	949	41,0	4245
900	20	.0900.200.0	810	445	1285	914,0	8,0	225	40,0	330	7163,0	215,0	569	69,0	2547
1000	7	.1000.070.0	640	434	1395	1016,0	8,0	250	49,4	105	8791,0	264,0	2379	27,0	11286
1000	13	.1000.130.0	745	466	1395	1016,0	8,0	250	49,4	210	8791,0	264,0	1189	54,0	5643
1000	19	.1000.190.0	885	507	1395	1016,0	8,0	250	49,4	350	8791,0	264,0	713	90,0	3386
1200	6	.1200.062.0	640	579	1595	1220,0	10,0	250	74,1	105	12341,0	370,0	3743	38,0	18919
1200	12	.1200.120.0	745	615	1595	1220,0	10,0	250	74,1	210	12341,0	370,0	1872	75,0	9459
1200	17	.1200.170.0	885	662	1595	1220,0	10,0	250	74,1	350	12341,0	370,0	1124	126,0	5676
1400	4	.1400.039.0	620	741	1845	1420,0	10,0	250	86,4	121	16650,0	666,0	8394	58,0	21131
1400	8	.1400.075.0	740	778	1845	1420,0	10,0	250	86,4	241	16650,0	666,0	4195	117,0	10565
1400	11	.1400.110.0	900	827	1845	1420,0	10,0	250	86,4	402	16650,0	666,0	2516	195,0	6339

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 06...



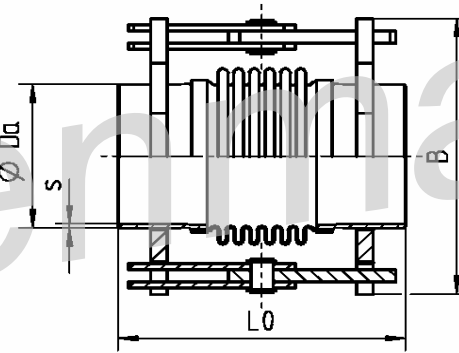
PN 6

Nominal diameter	Nominal angular movement absorption	Type  WRN 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick- ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
1600	3	.1600.033.0	720	1094	2090	1620,0	10,0	300	118,4	121	21538,0	1077,0	12301	76,0	31425
1600	6	.1600.063.0	840	1138	2090	1620,0	10,0	300	118,4	241	21538,0	1077,0	6150	151,0	15713
1600	9	.1600.093.0	1000	1201	2090	1620,0	10,0	300	118,4	402	21538,0	1077,0	3691	252,0	9428
1800	3	.1800.029.0	720	1211	2290	1820,0	10,0	300	133,1	121	27055,0	1353,0	17255	95,0	44615
1800	6	.1800.056.0	840	1258	2290	1820,0	10,0	300	133,1	241	27055,0	1353,0	8628	190,0	22307
1800	9	.1800.085.0	1000	1325	2290	1820,0	10,0	300	133,1	402	27055,0	1353,0	5178	316,0	13384
2000	3	.2000.027.0	820	1877	2600	2020,0	10,0	350	172,4	121	33200,0	2075,0	23378	116,0	61058
2000	5	.2000.051.0	940	1924	2600	2020,0	10,0	350	172,4	241	33200,0	2075,0	11694	233,0	30529
2000	8	.2000.078.0	1100	2016	2600	2020,0	10,0	350	172,4	402	33200,0	2075,0	7018	388,0	18317

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 10...



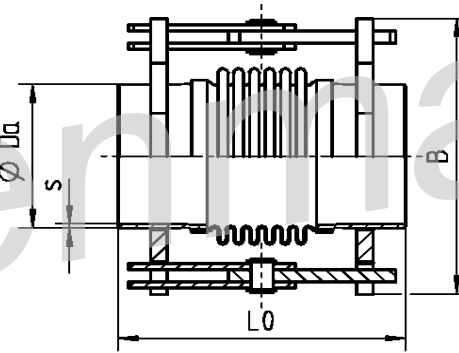
PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	Da	s	L	G	l <sub>b</sub>	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	17	.0050.170.0	210	5	200	60,3	4	90	0,5	27	46	0,5	2,2	0,04	1,9
50	27	.0050.270.0	225	5	200	60,3	4,0	90	0,5	45	46,0	0,5	1,3	0,1	1,1
50	37	.0050.370.0	250	6	200	60,3	4,0	90	0,5	72	46,0	0,5	0,8	0,1	0,7
65	16	.0065.160.0	210	6	220	76,1	4,0	90	0,6	27	68,7	0,7	3,2	0,1	3,5
65	29	.0065.290.0	235	6	220	76,1	4,0	90	0,6	54	68,7	0,7	1,6	0,1	1,7
65	37	.0065.370.0	260	7	220	76,1	4,0	90	0,6	80	69,4	0,7	1,8	0,2	1,9
80	16	.0080.160.0	215	7	235	88,9	4,0	90	0,7	33	89,1	0,9	6,3	0,1	7,4
80	25	.0080.250.0	235	7	235	88,9	4,0	90	0,7	55	89,1	0,9	3,8	0,1	4,4
80	36	.0080.360.0	265	7	235	88,9	4,0	90	0,7	88	89,1	0,9	2,4	0,2	2,8
100	17	.0100.170.0	215	8	265	114,3	4,0	90	1,0	36	138,0	1,4	8,2	0,1	13
100	26	.0100.260.0	240	8	265	114,3	4,0	90	1,0	60	138,0	1,4	4,9	0,2	7,8
100	36	.0100.360.0	275	9	265	114,3	4,0	90	1,0	96	138,0	1,4	3,1	0,4	4,9

# Angular expansion joints with weld ends

Single hinge version

Typ WRN 10...



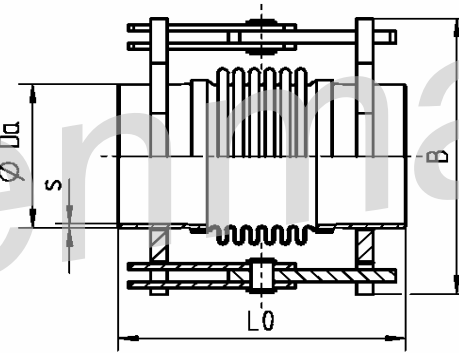
PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	16	.0125.160.0	260	11	290	139,7	4,0	100	1,3	42	184,0	1,8	10	0,2	18
125	25	.0125.250.0	285	12	290	139,7	4,0	100	1,3	70	184,0	1,8	6	0,4	11
125	32	.0125.320.0	315	12	290	139,7	4,0	100	1,3	98	184,0	1,8	4,3	0,5	7,9
150	15	.0150.150.0	260	14	325	168,3	4,5	100	1,8	45	264,0	2,6	25	0,3	52
150	27	.0150.270.0	305	15	325	168,3	4,5	100	1,8	90	264,0	2,6	13	0,7	26
150	36	.0150.360.0	350	17	325	168,3	4,5	100	1,8	135	264,0	2,6	8,4	1,0	17
200	14	.0200.140.0	270	24	385	219,1	6,3	100	3,3	51	436,0	4,4	39	0,6	104
200	26	.0200.260.0	320	25	385	219,1	6,3	100	3,3	102	436,0	4,4	20	1,3	52
200	35	.0200.350.0	370	28	385	219,1	6,3	100	3,3	153	439,0	4,4	15	2,0	40
250	14	.0250.140.0	295	41	485	273,0	7,1	110	5,1	54	670,0	12,0	52	1,1	184
250	21	.0250.210.0	330	43	485	273,0	7,1	110	5,1	90	670,0	12,0	31	1,8	110
250	30	.0250.300.0	390	47	485	273,0	7,1	110	5,1	152	674,0	12,0	22	3,0	80

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 10...



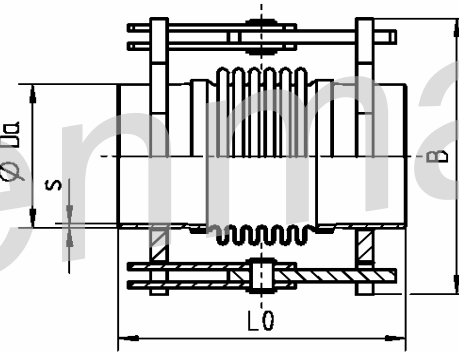
PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	15	.0300.150.0	330	58	545	323,9	8,0	120	7,4	63	935,0	17,0	76	1,7	326
300	23	.0300.230.0	370	61	545	323,9	8,0	120	7,4	105	935,0	17,0	45	2,9	196
300	29	.0300.290.0	410	63	545	323,9	8,0	120	7,4	147	935,0	17,0	32	4,0	140
350	13	.0350.130.0	350	53	585	355,6	6,0	130	6,7	66	1113,0	20,0	104	2,1	438
350	21	.0350.210.0	395	56	585	355,6	6,0	130	6,7	110	1113,0	20,0	62	3,6	263
350	26	.0350.260.0	435	59	585	355,6	6,0	130	6,7	154	1113,0	20,0	45	5,0	188
400	9	.0400.094.0	355	71	645	406,4	6,0	130	7,7	72	1466,0	26,0	397	3,1	941
400	18	.0400.180.0	430	79	645	406,4	6,0	130	7,7	144	1466,0	26,0	198	6,1	471
400	26	.0400.260.0	520	90	645	406,4	6,0	130	7,7	240	1466,0	26,0	119	10,0	282
450	10	.0450.097.0	420	112	725	457,0	8,0	160	14,1	75	1844,0	33,0	482	4,0	1285
450	16	.0450.160.0	470	118	725	457,0	8,0	160	14,1	125	1844,0	33,0	289	6,7	771
450	23	.0450.230.0	545	128	725	457,0	8,0	160	14,1	200	1844,0	33,0	181	11,0	482

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 10...



PN 10

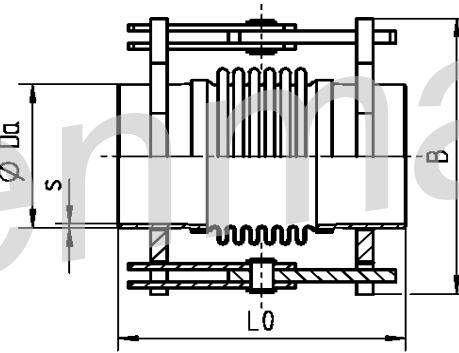
Nominal diameter	Nominal angular movement absorption	Type  WRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	10	.0500.100.0	470	150	795	508,0	8,0	180	17,6	81	2273,0	55,0	526	5,4	1638
500	16	.0500.160.0	525	158	795	508,0	8,0	180	17,6	135	2273,0	55,0	316	8,9	983
500	24	.0500.240.0	605	171	795	508,0	8,0	180	17,6	216	2273,0	55,0	197	14,0	614
600	9	.0600.094.0	475	180	905	610,0	8,0	180	21,2	87	3222,0	77,0	775	8,2	2702
600	15	.0600.150.0	535	190	905	610,0	8,0	180	21,2	145	3222,0	77,0	465	14,0	1621
600	23	.0600.230.0	645	211	905	610,0	8,0	180	21,2	261	3222,0	77,0	259	24,0	901
700	9	.0700.086.0	525	292	1065	711,0	8,0	200	27,6	96	4353,0	131,0	1381	12,0	5375
700	16	.0700.160.0	620	320	1065	711,0	8,0	200	27,6	192	4353,0	131,0	690	24,0	2687
700	22	.0700.220.0	715	348	1065	711,0	8,0	200	27,6	288	4353,0	131,0	461	36,0	1792
800	8	.0800.084.0	585	355	1165	813,0	10,0	225	44,3	102	5635,0	169,0	1794	17,0	7687
800	15	.0800.150.0	685	388	1165	813,0	10,0	225	44,3	204	5635,0	169,0	897	33,0	3843
800	22	.0800.220.0	820	429	1165	813,0	10,0	225	44,3	340	5635,0	169,0	538	56,0	2306



## Angular expansion joints with weld ends

Single hinge version

Typ WRN 10...



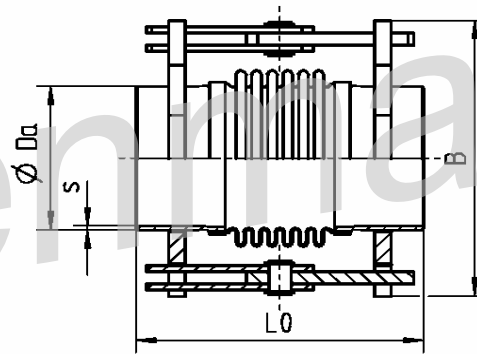
PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
900	7	.0900.074.0	635	469	1295	914,0	10,0	250	55,4	102	7178,0	215,0	2542	21,0	11251
900	14	.0900.140.0	735	505	1295	914,0	10,0	250	55,4	204	7178,0	215,0	1272	43,0	5625
900	20	.0900.200.0	870	552	1295	914,0	10,0	250	55,4	340	7178,0	215,0	764	71,0	3375
1000	6	.1000.057.0	745	689	1455	1016,0	10,0	300	74,0	108	8866,0	355,0	5007	28,0	14723
1000	11	.1000.110.0	850	736	1455	1016,0	10,0	300	74,0	216	8866,0	355,0	2502	56,0	7362
1000	16	.1000.160.0	995	801	1455	1016,0	10,0	300	74,0	360	8866,0	355,0	1502	93,0	4417
1200	6	.1200.059.0	750	885	1690	1220,0	10,0	300	89,0	111	12341,0	617,0	5354	40,0	25445
1200	11	.1200.110.0	860	942	1690	1220,0	10,0	300	89,0	222	12341,0	617,0	2677	80,0	12723
1200	15	.1200.150.0	965	1000	1690	1220,0	10,0	300	89,0	333	12341,0	617,0	1786	120,0	8482
1400	4	.1400.037.0	825	1413	1990	1420,0	10,0	350	120,9	125	16650,0	1041,0	11650	60,0	28347
1400	7	.1400.069.0	950	1458	1990	1420,0	10,0	350	120,9	250	16650,0	1041,0	5827	121,0	14173
1400	10	.1400.099.0	1115	1551	1990	1420,0	10,0	350	120,9	416	16650,0	1041,0	3496	201,0	8504

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 16...



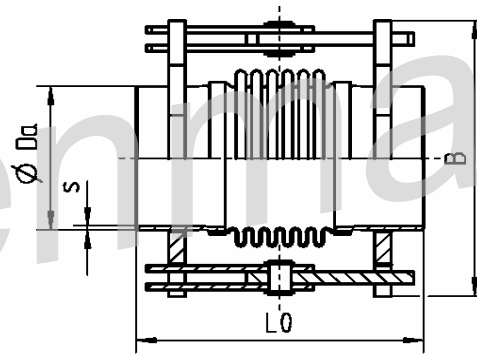
PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	16	.0050.160.0	210	5	200	60,3	4	90	0,5	27	46	0,5	3,7	0,04	2,9
50	25	.0050.250.0	225	6	200	60,3	4,0	90	0,5	45	46,0	0,5	2,2	0,1	1,8
50	34	.0050.340.0	250	6	200	60,3	4,0	90	0,5	72	46,0	0,5	1,4	0,1	1,1
65	16	.0065.160.0	210	6	220	76,1	4,0	90	0,6	30	69,4	0,7	4,9	0,1	5,1
65	25	.0065.250.0	230	6	220	76,1	4,0	90	0,6	50	69,4	0,7	2,9	0,1	3
65	34	.0065.340.0	265	7	220	76,1	4,0	90	0,6	88	70,1	0,7	3,3	0,2	3,1
80	14	.0080.140.0	235	9	235	88,9	4,0	100	0,8	36	89,9	0,9	12	0,1	12
80	23	.0080.230.0	260	9	235	88,9	4,0	100	0,8	60	89,9	0,9	6,9	0,2	7,3
80	32	.0080.320.0	295	10	235	88,9	4,0	100	0,8	96	89,9	0,9	4,3	0,3	4,5
100	15	.0100.150.0	240	10	265	114,3	4,0	100	1,1	39	139,0	1,4	15	0,2	21
100	24	.0100.240.0	265	11	265	114,3	4,0	100	1,1	65	139,0	1,4	8,8	0,3	13
100	33	.0100.330.0	305	12	265	114,3	4,0	100	1,1	104	139,0	1,4	5,5	0,4	8

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 16...



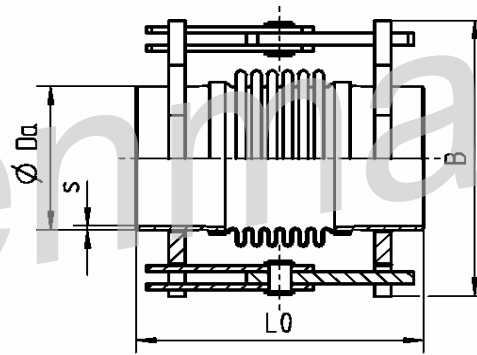
PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	15	.0125.150.0	260	12	290	139,7	4,0	100	1,3	42	185,0	1,9	18	0,2	31
125	24	.0125.240.0	285	12	290	139,7	4,0	100	1,3	70	185,0	1,9	11	0,4	19
125	33	.0125.330.0	335	14	290	139,7	4,0	100	1,3	120	186,0	1,9	8,1	0,7	14
150	14	.0150.140.0	260	17	325	168,3	4,5	100	1,8	45	264,0	2,6	25	0,3	52
150	22	.0150.220.0	290	17	325	168,3	4,5	100	1,8	75	264,0	2,6	15	0,6	31
150	31	.0150.310.0	345	19	325	168,3	4,5	100	1,8	128	266,0	2,7	11	1,0	23
200	14	.0200.140.0	315	39	425	219,1	6,3	120	3,9	54	441,0	7,9	63	0,7	161
200	22	.0200.220.0	350	41	425	219,1	6,3	120	3,9	90	441,0	7,9	38	1,2	96
200	31	.0200.310.0	405	44	425	219,1	6,3	120	3,9	144	441,0	7,9	24	1,8	60
250	9	.0250.091.0	320	48	485	273,0	7,1	120	5,6	57	674,0	12,0	160	1,1	238
250	16	.0250.160.0	375	51	485	273,0	7,1	120	5,6	114	674,0	12,0	80	2,2	119
250	23	.0250.230.0	430	57	485	273,0	7,1	120	5,6	171	677,0	12,0	67	3,4	99

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 16...



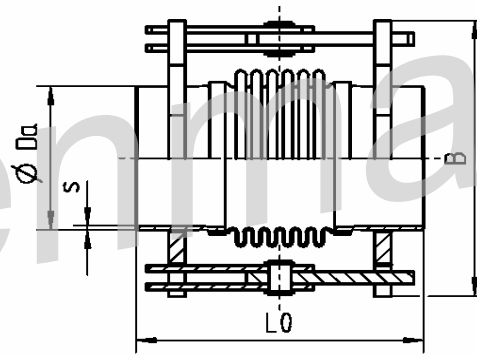
PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	10	.0300.096.0	350	67	545	323,9	8,0	130	8,1	63	940,0	17,0	246	1,7	449
300	15	.0300.150.0	390	71	545	323,9	8,0	130	8,1	105	940,0	17,0	147	2,9	269
300	22	.0300.220.0	470	78	545	323,9	8,0	130	8,1	189	940,0	17,0	82	5,2	150
350	9	.0350.088.0	410	83	605	355,6	8,0	160	10,9	63	1128,0	20,0	288	2,1	580
350	14	.0350.140.0	450	87	605	355,6	8,0	160	10,9	105	1128,0	20,0	173	3,4	348
350	20	.0350.200.0	530	94	605	355,6	8,0	160	10,9	189	1128,0	20,0	96	6,2	193
400	9	.0400.093.0	425	119	685	406,4	8,0	160	12,5	78	1476,0	35,0	517	3,3	1218
400	15	.0400.150.0	475	128	685	406,4	8,0	160	12,5	130	1476,0	35,0	310	5,6	731
400	23	.0400.230.0	575	145	685	406,4	8,0	160	12,5	234	1476,0	35,0	172	10,0	406
450	9	.0450.090.0	425	134	745	457,0	8,0	160	14,1	78	1851,0	44,0	654	4,2	1700
450	14	.0450.140.0	475	144	745	457,0	8,0	160	14,1	130	1851,0	44,0	392	7,0	1020
450	22	.0450.220.0	575	163	745	457,0	8,0	160	14,1	234	1851,0	44,0	218	13,0	567

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 16...



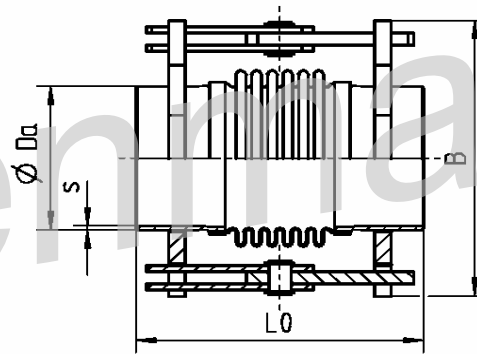
PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	10	.0500.099.0	475	173	795	508,0	8,0	180	17,6	84	2282,0	55,0	715	5,6	2169
500	16	.0500.160.0	530	184	795	508,0	8,0	180	17,6	140	2282,0	55,0	429	9,3	1302
500	22	.0500.220.0	610	200	795	508,0	8,0	180	17,6	224	2282,0	55,0	268	15,0	813
600	6	.0600.063.0	520	259	945	610,0	8,0	200	23,6	90	3232,0	97,0	2052	8,5	3775
600	12	.0600.120.0	610	283	945	610,0	8,0	200	23,6	180	3232,0	97,0	1026	17,0	1888
600	16	.0600.160.0	695	308	945	610,0	8,0	200	23,6	270	3232,0	97,0	684	25,0	1258
700	6	.0700.063.0	570	348	1065	711,0	10,0	225	38,6	93	4365,0	131,0	2524	12,0	5580
700	12	.0700.120.0	665	377	1065	711,0	10,0	225	38,6	186	4365,0	131,0	1262	24,0	2790
700	16	.0700.160.0	755	406	1065	711,0	10,0	225	38,6	279	4365,0	131,0	841	35,0	1860
800	6	.0800.060.0	630	521	1225	813,0	10,0	250	49,2	96	5641,0	226,0	3410	16,0	8117
800	11	.0800.110.0	725	557	1225	813,0	10,0	250	49,2	192	5641,0	226,0	1705	32,0	4059
800	15	.0800.150.0	820	595	1225	813,0	10,0	250	49,2	288	5641,0	226,0	1136	47,0	2706

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 16...



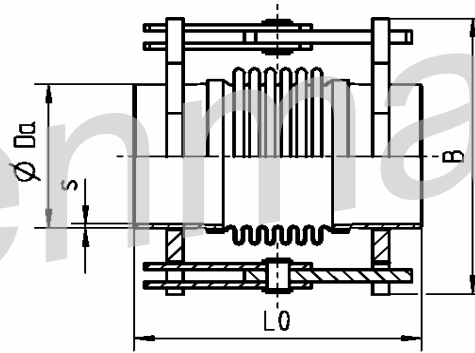
PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
900	6	.0900.060.0	735	792	1390	914,0	10,0	300	66,5	102	7238,0	362,0	4707	21,0	12941
900	11	.0900.110.0	835	841	1390	914,0	10,0	300	66,5	204	7238,0	362,0	2352	43,0	6471
900	16	.0900.160.0	970	913	1390	914,0	10,0	300	66,5	340	7238,0	362,0	1411	72,0	3882
1000	6	.1000.057.0	755	880	1500	1016,0	10,0	300	74,0	114	8891,0	445,0	6654	29,0	19383
1000	9	.1000.091.0	830	925	1500	1016,0	10,0	300	74,0	190	8891,0	445,0	3994	49,0	11630
1000	14	.1000.140.0	980	1015	1500	1016,0	10,0	300	74,0	342	8891,0	445,0	2218	88,0	6461

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 25...



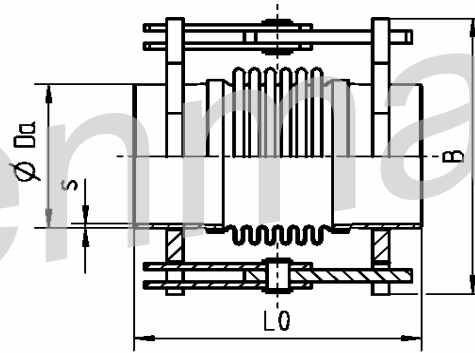
PN 25

Nominal diameter	Nominal angular movement absorption	Type  WRN 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	14	.0050.140.0	210	6	200	60,3	4	90	0,5	30	46,6	0,5	6,9	0,04	4,8
50	22	.0050.220.0	230	7	200	60,3	4,0	90	0,5	50	46,6	0,5	4,2	0,1	2,9
50	30	.0050.300.0	260	7	200	60,3	4,0	90	0,5	80	46,6	0,5	2,6	0,1	1,8
65	15	.0065.150.0	235	7	220	76,1	4,0	100	0,7	33	70,1	0,7	8,8	0,1	8,4
65	23	.0065.230.0	255	8	220	76,1	4,0	100	0,7	55	70,1	0,7	5,3	0,1	5
65	29	.0065.290.0	275	8	220	76,1	4,0	100	0,7	77	70,1	0,7	3,8	0,2	3,6
80	14	.0080.140.0	235	9	235	88,9	4,0	100	0,8	36	90,8	0,9	14	0,1	14
80	22	.0080.220.0	260	9	235	88,9	4,0	100	0,8	60	90,8	0,9	8,3	0,2	8,6
80	28	.0080.280.0	285	10	235	88,9	4,0	100	0,8	84	90,8	0,9	5,9	0,2	6,2
100	14	.0100.140.0	240	12	265	114,3	4,0	100	1,1	39	140,0	1,4	18	0,2	25
100	22	.0100.220.0	265	13	265	114,3	4,0	100	1,1	65	140,0	1,4	11	0,3	15
100	27	.0100.270.0	290	13	265	114,3	4,0	100	1,1	91	140,0	1,4	7,5	0,4	11

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 25...



PN 25

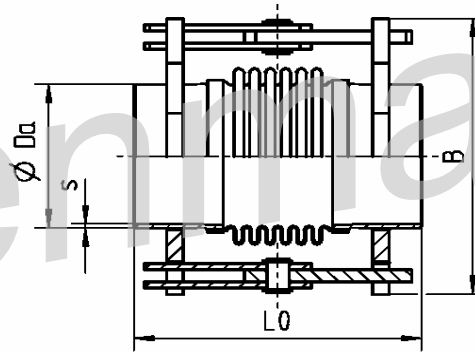
Nominal diameter	Nominal angular movement absorption	Type  WRN 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	14	.0125.140.0	265	14	290	139,7	4,0	100	1,3	48	187,0	1,9	31	0,3	48
125	22	.0125.220.0	295	15	290	139,7	4,0	100	1,3	80	187,0	1,9	19	0,4	29
125	27	.0125.270.0	325	16	290	139,7	4,0	100	1,3	112	187,0	1,9	13	0,6	21
150	13	.0150.130.0	305	29	365	168,3	4,5	120	2,2	48	267,0	4,8	44	0,4	82
150	20	.0150.200.0	335	31	365	168,3	4,5	120	2,2	80	267,0	4,8	26	0,6	49
150	27	.0150.270.0	385	33	365	168,3	4,5	120	2,2	128	267,0	4,8	16	1,0	31
200	9	.0200.091.0	335	44	425	219,1	6,3	130	4,3	54	443,0	8,0	140	0,7	165
200	16	.0200.160.0	390	47	425	219,1	6,3	130	4,3	108	443,0	8,0	70	1,4	82
200	22	.0200.220.0	440	52	425	219,1	6,3	130	4,3	162	445,0	8,0	57	2,1	66
250	9	.0250.090.0	340	55	485	273,0	7,1	130	6,0	60	679,0	12,0	245	1,2	353
250	14	.0250.140.0	380	58	485	273,0	7,1	130	6,0	100	679,0	12,0	147	2,0	212
250	20	.0250.200.0	440	63	485	273,0	7,1	130	6,0	160	679,0	12,0	92	3,2	133



## Angular expansion joints with weld ends

Single hinge version

Typ WRN 25...



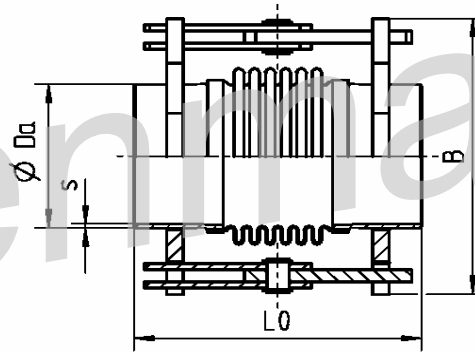
PN 25

Nominal diameter	Nominal angular movement absorption	Type  WRN 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	9	.0300.087.0	410	105	585	323,9	8,0	160	9,9	66	940,0	23,0	313	1,8	542
300	14	.0300.140.0	455	110	585	323,9	8,0	160	9,9	110	940,0	23,0	188	3,0	325
300	18	.0300.180.0	520	118	585	323,9	8,0	160	9,9	176	940,0	23,0	118	4,8	203
350	9	.0350.088.0	455	120	625	355,6	8,0	180	12,3	72	1140,0	27,0	458	2,4	890
350	14	.0350.140.0	505	127	625	355,6	8,0	180	12,3	120	1140,0	27,0	275	4,0	534
350	20	.0350.200.0	600	142	625	355,6	8,0	180	12,3	216	1140,0	27,0	153	7,2	297
400	6	.0400.062.0	460	138	685	406,4	8,0	180	14,1	75	1473,0	35,0	1055	3,2	1314
400	12	.0400.120.0	535	151	685	406,4	8,0	180	14,1	150	1473,0	35,0	528	6,4	657
400	16	.0400.160.0	605	164	685	406,4	8,0	180	14,1	225	1473,0	35,0	352	9,6	438
450	6	.0450.063.0	505	221	785	457,0	8,0	200	17,6	78	1847,0	55,0	1336	4,2	1819
450	12	.0450.120.0	580	237	785	457,0	8,0	200	17,6	156	1847,0	55,0	668	8,4	910
450	16	.0450.160.0	655	254	785	457,0	8,0	200	17,6	234	1847,0	55,0	445	13,0	606

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 25...



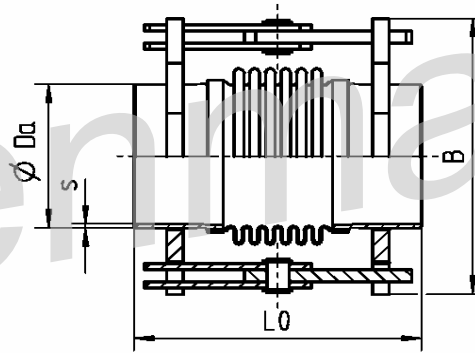
PN 25

Nominal diameter	Nominal angular movement absorption	Type  WRN 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	6	.0500.062.0	525	253	845	508,0	8,0	200	19,6	90	2290,0	69,0	1944	6,0	3039
500	10	.0500.100.0	585	270	845	508,0	8,0	200	19,6	150	2290,0	69,0	1166	10,0	1824
500	16	.0500.160.0	705	304	845	508,0	8,0	200	19,6	270	2290,0	69,0	648	18,0	1013
600	6	.0600.063.0	585	416	1005	610,0	10,0	225	33,1	96	3257,0	130,0	2543	9,1	4845
600	10	.0600.100.0	645	438	1005	610,0	10,0	225	33,1	160	3257,0	130,0	1526	15,0	2907
600	15	.0600.150.0	770	484	1005	610,0	10,0	225	33,1	288	3257,0	130,0	848	27,0	1615
700	6	.0700.059.0	735	636	1160	711,0	10,0	300	51,5	99	4371,0	219,0	3611	13,0	7494
700	9	.0700.093.0	800	655	1160	711,0	10,0	300	51,5	165	4371,0	219,0	2167	21,0	4496
700	14	.0700.140.0	930	716	1160	711,0	10,0	300	51,5	297	4371,0	219,0	1203	38,0	2498

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 40...



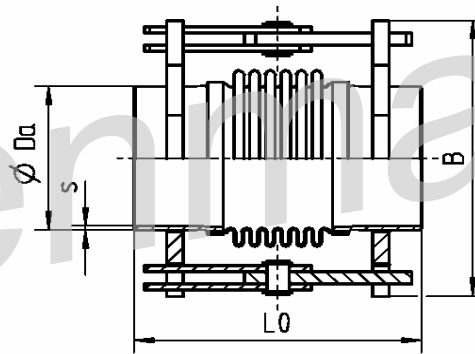
PN 40

Nominal diameter	Nominal angular movement absorption	Type  WRN 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_f$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	14	.0050.140.0	235	6	200	60,3	4	100	0,6	33	47,2	0,5	8,7	0,05	5,6
50	21	.0050.210.0	255	7	200	60,3	4,0	100	0,6	55	47,2	0,5	5,2	0,1	3,4
50	25	.0050.250.0	275	7	200	60,3	4,0	100	0,6	77	47,2	0,5	3,7	0,1	2,4
65	12	.0065.120.0	235	8	220	76,1	4,0	100	0,7	36	71,6	0,7	16	0,1	13
65	19	.0065.190.0	260	8	220	76,1	4,0	100	0,7	60	71,6	0,7	9,6	0,1	7,8
65	26	.0065.260.0	295	9	220	76,1	4,0	100	0,7	96	71,6	0,7	6	0,2	4,9
80	13	.0080.130.0	240	10	230	88,9	4,0	100	0,8	39	92,5	0,9	19	0,1	18
80	20	.0080.200.0	265	11	230	88,9	4,0	100	0,8	65	92,5	0,9	11	0,2	11
80	24	.0080.240.0	290	11	230	88,9	4,0	100	0,8	91	92,5	0,9	8,2	0,2	7,9
100	8	.0100.077.0	240	12	265	114,3	4,0	100	1,1	39	136,0	1,4	45	0,2	23
100	12	.0100.120.0	265	13	265	114,3	4,0	100	1,1	65	136,0	1,4	27	0,3	14
100	17	.0100.170.0	315	14	265	114,3	4,0	100	1,1	117	136,0	1,4	22	0,5	11

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 40...



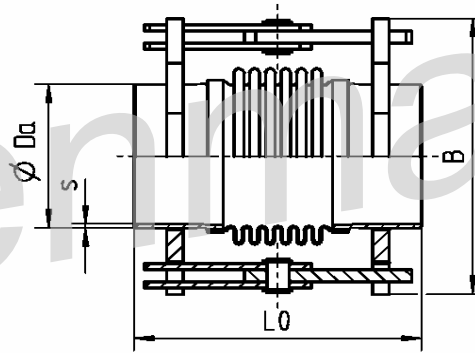
PN 40

Nominal diameter	Nominal angular movement absorption	Type  WRN 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	9	.0125.086.0	305	25	335	139,7	4,0	120	1,6	48	187,0	3,4	72	0,3	50
125	13	.0125.130.0	335	27	335	139,7	4,0	120	1,6	80	187,0	3,4	43	0,4	30
125	17	.0125.170.0	365	28	335	139,7	4,0	120	1,6	112	187,0	3,4	31	0,6	21
150	9	.0150.086.0	325	33	365	168,3	4,5	130	2,3	48	269,0	4,8	96	0,4	84
150	13	.0150.130.0	355	34	365	168,3	4,5	130	2,3	80	269,0	4,8	58	0,6	50
150	17	.0150.170.0	385	36	365	168,3	4,5	130	2,3	112	269,0	4,8	41	0,9	36
200	8	.0200.077.0	340	53	425	219,1	6,3	130	4,3	60	447,0	8,0	253	0,8	263
200	12	.0200.120.0	380	57	425	219,1	6,3	130	4,3	100	447,0	8,0	152	1,3	158
200	17	.0200.170.0	440	61	425	219,1	6,3	130	4,3	160	447,0	8,0	95	2,1	99
250	8	.0250.078.0	405	90	525	273,0	7,1	160	7,4	63	683,0	16,0	338	1,3	467
250	12	.0250.120.0	445	95	525	273,0	7,1	160	7,4	105	683,0	16,0	203	2,1	280
250	17	.0250.170.0	505	103	525	273,0	7,1	160	7,4	168	683,0	16,0	127	3,3	175

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 40...



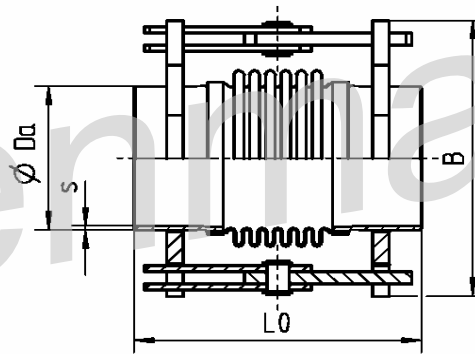
PN 40

Nominal diameter	Nominal angular movement absorption	Type  WRN 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_f$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	6	.0300.058.0	415	122	585	323,9	8,0	160	9,9	69	946,0	23,0	833	1,9	757
300	9	.0300.092.0	460	129	585	323,9	8,0	160	9,9	115	946,0	23,0	500	3,2	454
300	14	.0300.140.0	550	142	585	323,9	8,0	160	9,9	207	946,0	23,0	278	5,7	252
350	6	.0350.061.0	495	180	675	355,6	8,0	200	13,6	72	1140,0	34,0	884	2,4	940
350	10	.0350.097.0	545	186	675	355,6	8,0	200	13,6	120	1140,0	34,0	530	4,0	564
350	14	.0350.140.0	640	205	675	355,6	8,0	200	13,6	216	1140,0	34,0	295	7,2	313
400	6	.0400.061.0	505	207	725	406,4	10,0	200	19,4	81	1483,0	44,0	1154	3,5	1477
400	10	.0400.097.0	560	219	725	406,4	10,0	200	19,4	135	1483,0	44,0	692	5,8	886
400	14	.0400.140.0	665	243	725	406,4	10,0	200	19,4	243	1483,0	44,0	385	10,0	492
450	6	.0450.058.0	520	255	785	457,0	10,0	200	21,9	87	1863,0	56,0	1717	4,7	2334
450	9	.0450.093.0	575	270	785	457,0	10,0	200	21,9	145	1863,0	56,0	1030	7,9	1400
450	13	.0450.130.0	665	292	785	457,0	10,0	200	21,9	232	1863,0	56,0	644	13,0	875

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 40...



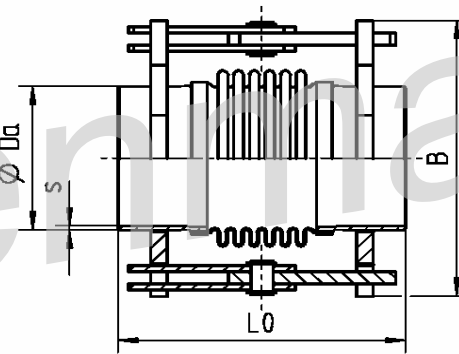
**PN 40**

Nominal diameter	Nominal angular movement absorption	Type  <b>WRN 40 ...</b>	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_f$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	4	.0500.044.0	615	389	895	508,0	10,0	250	30,5	87	2286,0	91,0	3287	5,8	2726
500	7	.0500.070.0	675	400	895	508,0	10,0	250	30,5	145	2286,0	91,0	1972	9,6	1636
500	11	.0500.110.0	785	436	895	508,0	10,0	250	30,5	261	2286,0	91,0	1095	17,0	909

# Angular expansion joints with weld ends

Single hinge version

Typ WRN 63...



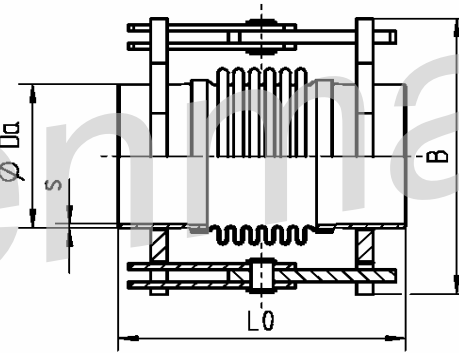
PN 63

Nominal diameter	Nominal angular movement absorption	Type  WRN 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	8,9	.0050.089.0	235	8	200	60,3	4,0	100	0,6	32	46,6	0,5	16	0,0	4,8
50	13	.0050.130.0	255	8	200	60,3	4,0	100	0,6	53	46,6	0,5	9,5	0,1	2,9
50	16	.0050.160.0	275	8	200	60,3	4,0	100	0,6	74	46,6	0,5	6,8	0,1	2
65	9	.0065.086.0	235	9	220	76,1	4,0	100	0,7	36	70,9	0,7	28	0,1	11
65	13	.0065.130.0	260	10	220	76,1	4,0	100	0,7	60	70,9	0,7	17	0,1	6,6
65	17	.0065.170.0	295	10	220	76,1	4,0	100	0,7	96	70,9	0,7	11	0,2	4,1
80	8	.0080.082.0	255	12	230	88,9	4,0	110	0,9	36	90,8	0,9	37	0,1	16
80	13	.0080.130.0	280	12	230	88,9	4,0	110	0,9	60	90,8	0,9	22	0,2	9,7
80	16	.0080.160.0	305	13	230	88,9	4,0	110	0,9	84	90,8	0,9	16	0,2	6,9
100	7	.0100.066.0	285	25	305	114,3	5,0	120	1,6	42	137,0	2,5	86	0,2	39
100	10	.0100.100.0	310	26	305	114,3	5,0	120	1,6	70	137,0	2,5	52	0,3	24
100	14	.0100.140.0	350	28	305	114,3	5,0	120	1,6	112	137,0	2,5	32	0,4	15

## Angular expansion joints with weld ends

Single hinge version

Typ WRN 63...



PN 63

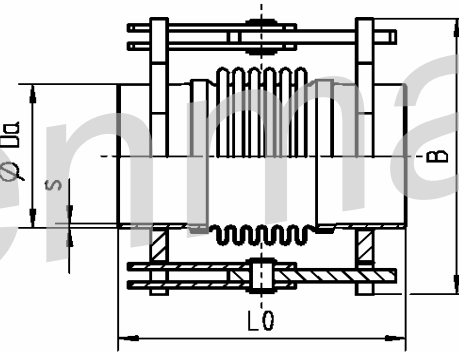
Nominal diameter	Nominal angular movement absorption	Type  WRN 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	8	.0125.084.0	330	31	335	139,7	6,3	130	2,7	51	189,0	3,4	90	0,3	59
125	11	.0125.110.0	345	31	335	139,7	6,3	130	2,7	68	189,0	3,4	68	0,4	45
125	16	.0125.160.0	395	34	335	139,7	6,3	130	2,7	119	189,0	3,4	39	0,7	25
150	7	.0150.071.0	360	43	365	168,3	6,3	140	3,5	57	272,0	4,9	178	0,5	132
150	11	.0150.110.0	395	45	365	168,3	6,3	140	3,5	95	272,0	4,9	107	0,8	79
150	14	.0150.140.0	430	47	365	168,3	6,3	140	3,5	133	272,0	4,9	76	1,1	57
200	5	.0200.053.0	405	86	465	219,1	8,0	160	6,6	63	445,0	11,0	515	0,8	280
200	10	.0200.099.0	465	93	465	219,1	8,0	160	6,6	126	445,0	11,0	258	1,6	140
200	13	.0200.130.0	525	100	465	219,1	8,0	160	6,6	189	445,0	11,0	172	2,4	93
250	5	.0250.051.0	490	135	555	273,0	10,0	200	12,9	69	686,0	16,0	788	1,4	568
250	8	.0250.081.0	535	141	555	273,0	10,0	200	12,9	115	686,0	16,0	473	2,3	341
250	12	.0250.120.0	625	154	555	273,0	10,0	200	12,9	207	686,0	16,0	263	4,1	189



## Angular expansion joints with weld ends

Single hinge version

Typ WRN 63...

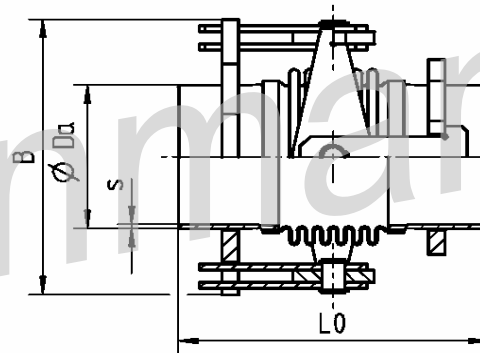


PN 63

Nominal diameter	Nominal angular movement absorption	Type  WRN 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	5	.0300.053.0	500	195	625	323,9	11,0	200	16,9	75	951,0	29,0	955	2,1	859
300	8	.0300.082.0	550	202	625	323,9	11,0	200	16,9	125	951,0	29,0	573	3,5	515
300	11	.0300.110.0	625	216	625	323,9	11,0	200	16,9	200	951,0	29,0	358	5,5	322
350	5	.0350.052.0	570	238	675	355,6	12,0	225	22,7	87	1161,0	35,0	1448	2,9	1474
350	10	.0350.097.0	655	259	675	355,6	12,0	225	22,7	174	1161,0	35,0	724	5,9	737
350	13	.0350.130.0	740	279	675	355,6	12,0	225	22,7	261	1161,0	35,0	483	8,8	491
400	4	.0400.039.0	605	347	785	406,4	15,0	250	36,0	81	1479,0	59,0	2378	3,5	1532
400	7	.0400.072.0	635	353	785	406,4	15,0	225	32,4	162	1479,0	59,0	1189	7,0	766
400	10	.0400.099.0	740	385	785	406,4	15,0	225	32,4	261	1486,0	59,0	956	11,0	603

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 02...

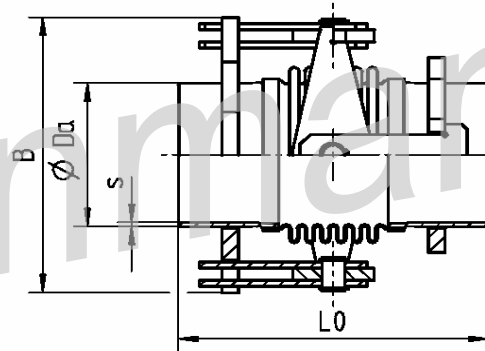


PN 2,5

Nominal diameter	Nominal angular movement absorption	Type  WRK 02 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
400	10	.0400.100.0	290	47	600	406,4	6	100	5,9	63	1445	14	142	2,6	331
400	20	.0400.200.0	350	50	600	406,4	6,0	100	5,9	126	1445	14,0	71	5,3	165
400	28	.0400.280.0	410	52	600	406,4	6,0	100	5,9	189	1445	14,0	47	7,9	110
450	10	.0450.099.0	290	55	660	457,0	6,0	100	6,6	66	1825	18,0	165	3,5	444
450	19	.0450.190.0	355	58	660	457,0	6,0	100	6,6	132	1825	18,0	82	7,0	222
450	26	.0450.260.0	420	61	660	457,0	6,0	100	6,6	198	1825	18,0	55	11,0	148
500	11	.0500.110.0	320	67	720	508,0	6,0	110	8,1	69	2252	23,0	179	4,5	569
500	20	.0500.200.0	385	71	720	508,0	6,0	110	8,1	138	2252	23,0	89	9,0	285
500	30	.0500.300.0	475	76	720	508,0	6,0	110	8,1	230	2252	23,0	54	15,0	171
600	10	.0600.100.0	345	99	820	610,0	6,0	120	10,7	78	3202	32,0	254	7,3	919
600	22	.0600.220.0	450	105	820	610,0	6,0	120	10,7	182	3202	32,0	109	17,0	394
600	29	.0600.290.0	550	111	820	610,0	6,0	120	10,7	286	3202	32,0	69	27,0	251

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 02...

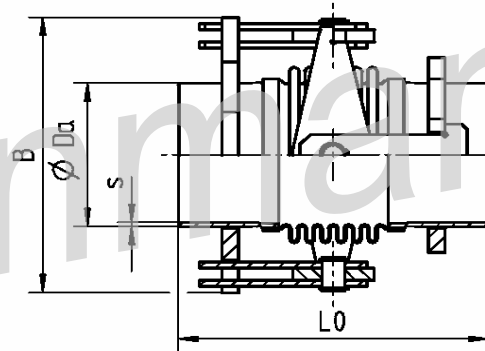


PN 2,5

Nominal diameter	Nominal angular movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
		WRK 02 ...				outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
700	9	.0700.091.0	395	158	975	711,0	6,0	140	14,5	84	4324	78,0	326	11,0	1363
700	17	.0700.170.0	475	164	975	711,0	6,0	140	14,5	168	4324	78,0	162	21,0	681
700	25	.0700.250.0	615	175	975	711,0	6,0	140	14,5	308	4324	78,0	89	39,0	372
800	8	.0800.084.0	440	219	1085	813,0	6,0	160	19,0	87	5588	101,0	456	14,0	2003
800	18	.0800.180.0	555	228	1085	813,0	6,0	160	19,0	203	5588	101,0	196	33,0	858
800	26	.0800.260.0	670	249	1085	813,0	6,0	160	19,0	319	5595	101,0	186	52,0	819
900	7	.0900.074.0	445	266	1205	914,0	6,0	160	21,4	90	7133	128,0	628	19,0	2882
900	14	.0900.140.0	530	275	1205	914,0	6,0	160	21,4	180	7133	128,0	313	37,0	1441
900	20	.0900.200.0	680	289	1205	914,0	6,0	160	21,4	330	7133	128,0	170	68,0	786
1000	8	.1000.077.0	495	345	1315	1016,0	6,0	180	26,7	96	8750	157,0	814	24,0	3869
1000	14	.1000.140.0	590	355	1315	1016,0	6,0	180	26,7	192	8750	157,0	408	49,0	1935
1000	22	.1000.220.0	725	380	1315	1016,0	6,0	180	26,7	330	8758	158,0	367	84,0	1731

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 02...

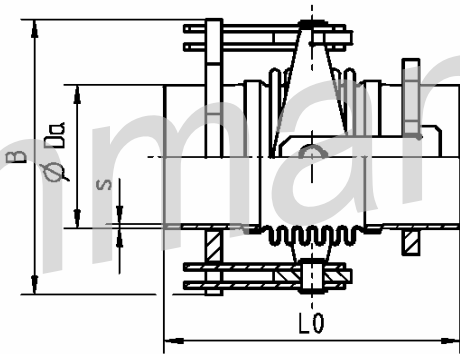


PN 2,5

Nominal diameter	Nominal angular movement absorption	Type  WRK 02 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
1200	7	.1200.065.0	535	567	1545	1220,0	8,0	200	47,5	96	12331	296,0	1750	34,0	9432
1200	12	.1200.120.0	630	585	1545	1220,0	8,0	200	47,5	192	12331	296,0	877	69,0	4716
1200	18	.1200.180.0	755	609	1545	1220,0	8,0	200	47,5	320	12331	296,0	524	115,0	2830
1400	8	.1400.077.0	680	807	1745	1420,0	8,0	225	62,3	232,8	16639	399,0	2782	113,0	7072
1400	12	.1400.120.0	850	860	1745	1420,0	8,0	225	62,3	402	16650	400,0	2516	195,0	6339
1600	7	.1600.068.0	680	1161	1995	1620,0	8,0	225	71,1	232,8	21525	646,0	4078	146,0	10518
1600	11	.1600.110.0	835	1195	1995	1620,0	8,0	225	71,1	388	21525	646,0	2446	243,0	6311
1800	10	.1800.095.0	835	1430	2185	1820,0	8,0	225	79,9	388	27040	811,0	3433	305,0	8959
2000	9	.2000.086.0	885	1846	2405	2020,0	8,0	250	98,6	388	33184	996,0	4655	375,0	12261

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 06...

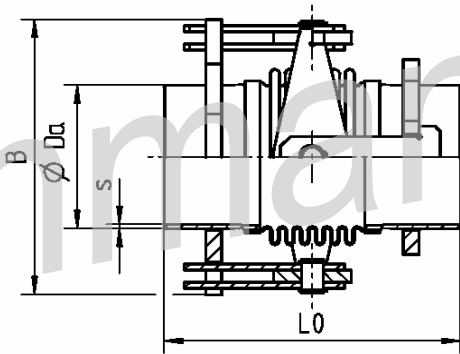


PN 6

Nominal diameter	Nominal angular movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
		WRK 06 ...				outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	18	.0050.180.0	210	8	200	60,3	4	90	0,5	27	46	0,5	2,2	0,04	1,9
50	28	.0050.280.0	225	9	200	60,3	4,0	90	0,5	45	46	0,5	1,3	0,1	1,1
50	37	.0050.370.0	240	9	200	60,3	4,0	90	0,5	63	46	0,5	1	0,1	0,8
65	17	.0065.170.0	210	9	220	76,1	4,0	90	0,6	27	68,7	0,7	3,2	0,1	3,5
65	27	.0065.270.0	225	10	220	76,1	4,0	90	0,6	45	68,7	0,7	1,9	0,1	2,1
65	39	.0065.390.0	250	10	220	76,1	4,0	90	0,6	72	68,7	0,7	1,2	0,1	1,3
80	17	.0080.170.0	210	10	235	88,9	4,0	90	0,7	30	89,1	0,9	3,9	0,1	4,9
80	27	.0080.270.0	230	11	235	88,9	4,0	90	0,7	50	89,1	0,9	2,3	0,1	2,9
80	38	.0080.380.0	260	11	235	88,9	4,0	90	0,7	80	89,1	0,9	1,5	0,2	1,8
100	17	.0100.170.0	215	12	265	114,3	4,0	90	1,0	33	137	1,4	5,5	0,1	8,9
100	27	.0100.270.0	235	13	265	114,3	4,0	90	1,0	55	137	1,4	3,3	0,2	5,3
100	38	.0100.380.0	265	13	265	114,3	4,0	90	1,0	88	137	1,4	2,1	0,4	3,3

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 06...

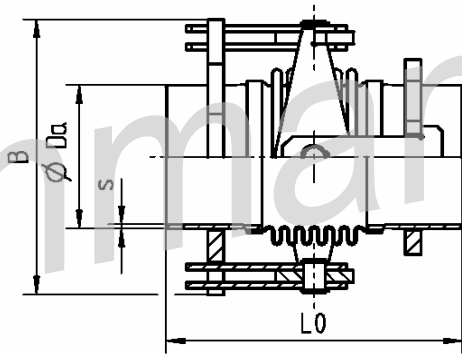


PN 6

Nominal diameter	Nominal angular movement absorption	Type  WRK 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	Da	s	L	G	l <sub>b</sub>	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	19	.0125.190.0	235	14	290	139,7	4,0	90	1,2	39	187	1,9	5	0,2	11
125	30	.0125.300.0	260	14	290	139,7	4,0	90	1,2	65	187	1,9	3	0,4	6,9
125	39	.0125.390.0	285	14	290	139,7	4,0	90	1,2	91	187	1,9	2,1	0,5	4,9
150	15	.0150.150.0	240	17	325	168,3	4,5	90	1,6	42	263	2,6	14	0,3	32
150	27	.0150.270.0	280	17	325	168,3	4,5	90	1,6	84	263	2,6	7,2	0,6	16
150	36	.0150.360.0	320	18	325	168,3	4,5	90	1,6	126	263	2,6	4,7	1,0	11
200	14	.0200.140.0	270	29	385	219,1	6,3	100	3,3	48	434	4,3	22	0,6	63
200	29	.0200.290.0	330	30	385	219,1	6,3	100	3,3	112	434	4,3	9,5	1,4	27
200	40	.0200.400.0	390	33	385	219,1	6,3	100	3,3	170	436	4,4	12	2,2	31
250	14	.0250.140.0	275	38	450	273,0	7,1	100	4,6	54	670	6,7	52	1,1	184
250	22	.0250.220.0	310	39	450	273,0	7,1	100	4,6	90	670	6,7	31	1,8	110
250	32	.0250.320.0	365	41	450	273,0	7,1	100	4,6	144	670	6,7	20	2,8	69

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 06...

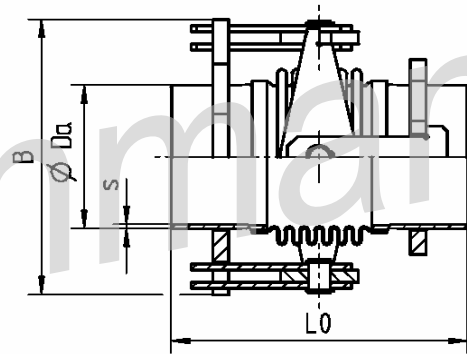


PN 6

Nominal diameter	Nominal angular movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
		WRK 06 ...				outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	15	.0300.150.0	285	53	500	323,9	8,0	100	6,2	60	932	9,3	63	1,6	276
300	23	.0300.230.0	325	54	500	323,9	8,0	100	6,2	100	932	9,3	38	2,7	166
300	34	.0300.340.0	385	57	500	323,9	8,0	100	6,2	160	932	9,3	24	4,3	104
350	13	.0350.130.0	330	71	585	355,6	6,0	120	6,2	63	1110	20,0	87	2,0	371
350	25	.0350.250.0	390	75	585	355,6	6,0	120	6,2	126	1110	20,0	43	4,1	185
350	34	.0350.340.0	460	80	585	355,6	6,0	120	6,2	198	1113	20,0	35	6,4	146
400	10	.0400.100.0	350	94	645	406,4	6,0	130	7,7	66	1456	26,0	194	2,8	478
400	19	.0400.190.0	415	99	645	406,4	6,0	130	7,7	132	1456	26,0	97	5,6	239
400	27	.0400.270.0	500	105	645	406,4	6,0	130	7,7	220	1456	26,0	58	9,3	143
450	10	.0450.098.0	355	111	705	457,0	6,0	130	8,6	69	1828	33,0	248	3,7	661
450	18	.0450.180.0	420	117	705	457,0	6,0	130	8,6	138	1828	33,0	124	7,3	331
450	24	.0450.240.0	490	122	705	457,0	6,0	130	8,6	207	1828	33,0	83	11,0	220

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 06...



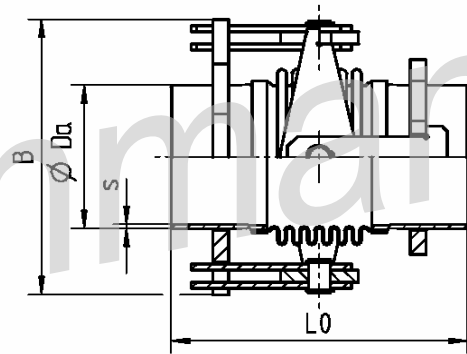
PN 6

Nominal diameter	Nominal angular movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
		WRK 06 ...				outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	10	.0500.100.0	385	144	755	508,0	6,0	140	10,3	75	2265	41,0	347	4,9	1108
500	17	.0500.170.0	435	150	755	508,0	6,0	140	10,3	125	2265	41,0	208	8,2	665
500	26	.0500.260.0	530	160	755	508,0	6,0	140	10,3	225	2265	41,0	116	15,0	369
600	10	.0600.100.0	435	243	905	610,0	6,0	160	14,2	84	3217	77,0	493	7,9	1792
600	16	.0600.160.0	490	250	905	610,0	6,0	160	14,2	140	3217	77,0	296	13,0	1075
600	25	.0600.250.0	600	266	905	610,0	6,0	160	14,2	252	3217	77,0	164	24,0	597
700	17	.0700.170.0	555	357	1015	711,0	8,0	180	24,8	168	4324	104,0	352	21,0	1394
700	24	.0700.240.0	655	385	1015	711,0	8,0	180	24,8	270	4342	104,0	341	34,0	1361
800	16	.0800.160.0	590	449	1125	813,0	8,0	180	28,4	198	5621	135,0	668	32,0	2900
800	23	.0800.230.0	720	479	1125	813,0	8,0	180	28,4	330	5621	135,0	401	54,0	1740
900	14	.0900.140.0	680	714	1285	914,0	8,0	225	40,0	198	7163	215,0	949	41,0	4245
900	20	.0900.200.0	810	751	1285	914,0	8,0	225	40,0	330	7163	215,0	569	69,0	2547



## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 06...

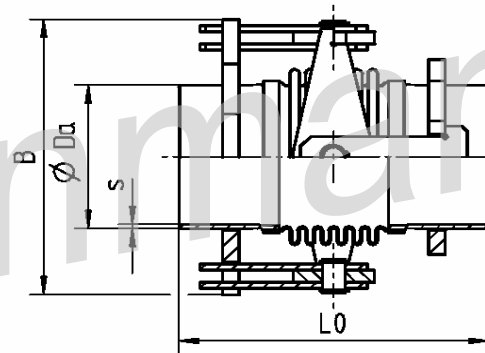


PN 6

Nominal diameter	Nominal angular movement absorption	Type  WRK 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thickness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
1000	13	.1000.130.0	745	861	1395	1016,0	8,0	250	49,4	210	8791	264,0	1189	54,0	5643
1000	19	.1000.190.0	885	902	1395	1016,0	8,0	250	49,4	350	8791	264,0	713	90,0	3386
1200	12	.1200.120.0	745	1184	1595	1220,0	10,0	250	74,1	210	12341	370,0	1872	75,0	9459
1200	17	.1200.170.0	885	1231	1595	1220,0	10,0	250	74,1	350	12341	370,0	1124	126,0	5676
1400	11	.1400.110.0	900	1747	1845	1420,0	10,0	250	86,4	402	16650	666,0	2516	195,0	6339
1600	9	.1600.093.0	1000	2585	2090	1620,0	10,0	300	118,4	402	21538	1077,0	3691	252,0	9428

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 10...

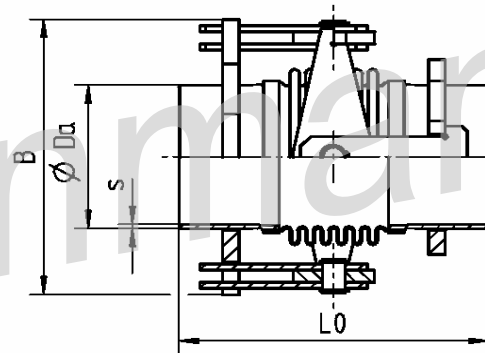


PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	17	.0050.170.0	210	8	200	60,3	4	90	0,5	27	46	0,5	2,2	0,04	1,9
50	27	.0050.270.0	225	9	200	60,3	4,0	90	0,5	45	46	0,5	1,3	0,1	1,1
50	37	.0050.370.0	250	9	200	60,3	4,0	90	0,5	72	46	0,5	0,8	0,1	0,7
65	16	.0065.160.0	210	9	220	76,1	4,0	90	0,6	27	68,7	0,7	3,2	0,1	3,5
65	29	.0065.290.0	235	10	220	76,1	4,0	90	0,6	54	68,7	0,7	1,6	0,1	1,7
65	37	.0065.370.0	260	10	220	76,1	4,0	90	0,6	80	69,4	0,7	1,8	0,2	1,9
80	16	.0080.160.0	215	10	235	88,9	4,0	90	0,7	33	89,1	0,9	6,3	0,1	7,4
80	25	.0080.250.0	235	11	235	88,9	4,0	90	0,7	55	89,1	0,9	3,8	0,1	4,4
80	36	.0080.360.0	265	11	235	88,9	4,0	90	0,7	88	89,1	0,9	2,4	0,2	2,8
100	17	.0100.170.0	215	12	265	114,3	4,0	90	1,0	36	138	1,4	8,2	0,1	13
100	26	.0100.260.0	240	13	265	114,3	4,0	90	1,0	60	138	1,4	4,9	0,2	7,8
100	36	.0100.360.0	275	13	265	114,3	4,0	90	1,0	96	138	1,4	3,1	0,4	4,9

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 10...

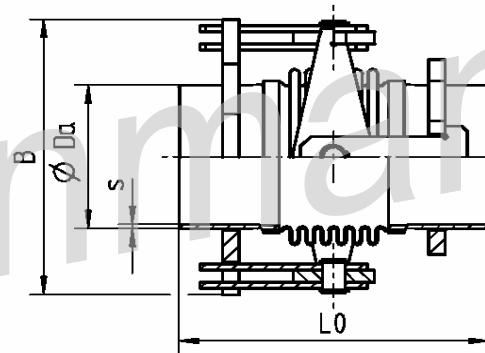


PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	16	.0125.160.0	260	16	290	139,7	4,0	100	1,3	42	184	1,8	10	0,2	18
125	25	.0125.250.0	285	17	290	139,7	4,0	100	1,3	70	184	1,8	6	0,4	11
125	32	.0125.320.0	315	17	290	139,7	4,0	100	1,3	98	184	1,8	4,3	0,5	7,9
150	15	.0150.150.0	260	21	325	168,3	4,5	100	1,8	45	264	2,6	25	0,3	52
150	27	.0150.270.0	305	22	325	168,3	4,5	100	1,8	90	264	2,6	13	0,7	26
150	36	.0150.360.0	350	23	325	168,3	4,5	100	1,8	135	264	2,6	8,4	1,0	17
200	14	.0200.140.0	270	33	385	219,1	6,3	100	3,3	51	436	4,4	39	0,6	104
200	26	.0200.260.0	320	34	385	219,1	6,3	100	3,3	102	436	4,4	20	1,3	52
200	35	.0200.350.0	370	37	385	219,1	6,3	100	3,3	153	439	4,4	15	2,0	40
250	14	.0250.140.0	295	59	485	273,0	7,1	110	5,1	54	670	12,0	52	1,1	184
250	21	.0250.210.0	330	61	485	273,0	7,1	110	5,1	90	670	12,0	31	1,8	110
250	30	.0250.300.0	390	66	485	273,0	7,1	110	5,1	152	674	12,0	22	3,0	80

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 10...

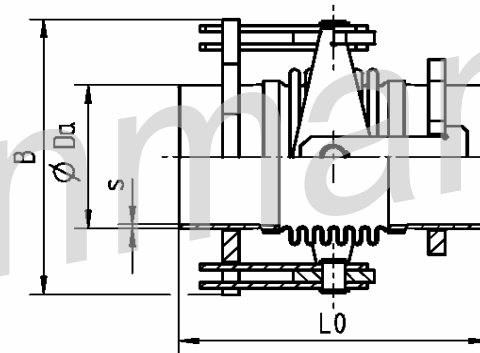


PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	15	.0300.150.0	330	86	545	323,9	8,0	120	7,4	63	935	17,0	76	1,7	326
300	23	.0300.230.0	370	89	545	323,9	8,0	120	7,4	105	935	17,0	45	2,9	196
300	29	.0300.290.0	410	91	545	323,9	8,0	120	7,4	147	935	17,0	32	4,0	140
350	13	.0350.130.0	350	86	585	355,6	6,0	130	6,7	66	1113	20,0	104	2,1	438
350	21	.0350.210.0	395	89	585	355,6	6,0	130	6,7	110	1113	20,0	62	3,6	263
350	26	.0350.260.0	435	92	585	355,6	6,0	130	6,7	154	1113	20,0	45	5,0	188
400	9	.0400.094.0	355	116	645	406,4	6,0	130	7,7	72	1466	26,0	397	3,1	941
400	18	.0400.180.0	430	124	645	406,4	6,0	130	7,7	144	1466	26,0	198	6,1	471
400	26	.0400.260.0	520	135	645	406,4	6,0	130	7,7	240	1466	26,0	119	10,0	282
450	10	.0450.097.0	420	166	725	457,0	8,0	160	14,1	75	1844	33,0	482	4,0	1285
450	16	.0450.160.0	470	173	725	457,0	8,0	160	14,1	125	1844	33,0	289	6,7	771
450	23	.0450.230.0	545	182	725	457,0	8,0	160	14,1	200	1844	33,0	181	11,0	482

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 10...

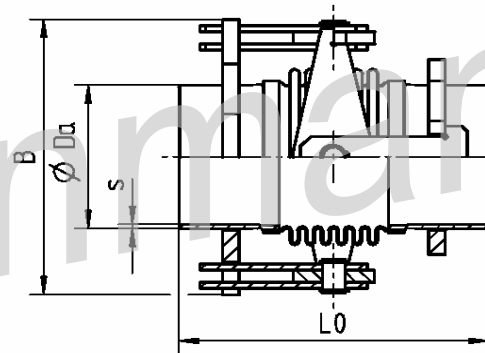


PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
500	10	.0500.100.0	470	243	795	508,0	8,0	180	17,6	81	2273	55,0	526	5,4	1638
500	16	.0500.160.0	525	251	795	508,0	8,0	180	17,6	135	2273	55,0	316	8,9	983
500	24	.0500.240.0	605	264	795	508,0	8,0	180	17,6	216	2273	55,0	197	14,0	614
600	15	.0600.150.0	535	327	905	610,0	8,0	180	21,2	145	3222	77,0	465	14,0	1621
600	23	.0600.230.0	645	348	905	610,0	8,0	180	21,2	261	3222	77,0	259	24,0	901
700	16	.0700.160.0	620	552	1065	711,0	8,0	200	27,6	192	4353	131,0	690	24,0	2687
700	22	.0700.220.0	715	580	1065	711,0	8,0	200	27,6	288	4353	131,0	461	36,0	1792
800	15	.0800.150.0	685	694	1165	813,0	10,0	225	44,3	204	5635	169,0	897	33,0	3843
800	22	.0800.220.0	820	735	1165	813,0	10,0	225	44,3	340	5635	169,0	538	56,0	2306
900	14	.0900.140.0	735	905	1295	914,0	10,0	250	55,4	204	7178	215,0	1272	43,0	5625
900	20	.0900.200.0	870	952	1295	914,0	10,0	250	55,4	340	7178	215,0	764	71,0	3375

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 10...

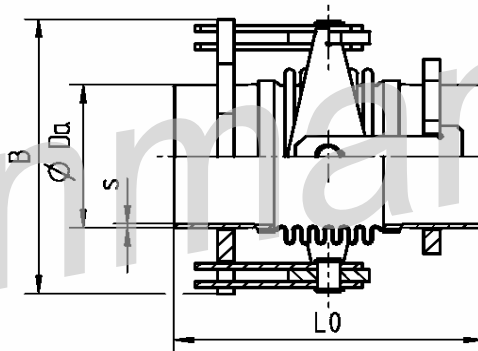


### PN 10

Nominal diameter	Nominal angular movement absorption	Type  WRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
1000	11	.1000.110.0	850	1338	1455	1016,0	10,0	300	74,0	216	8866	355,0	2502	56,0	7362
1000	16	.1000.160.0	995	1403	1455	1016,0	10,0	300	74,0	360	8866	355,0	1502	93,0	4417
1200	15	.1200.150.0	965	1971	1690	1220,0	10,0	300	89,0	333	12341	617,0	1786	120,0	8482
1400	10	.1400.099.0	1115	3168	1990	1420,0	10,0	350	120,9	416	16650	1041,0	3496	201,0	8504

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 16...

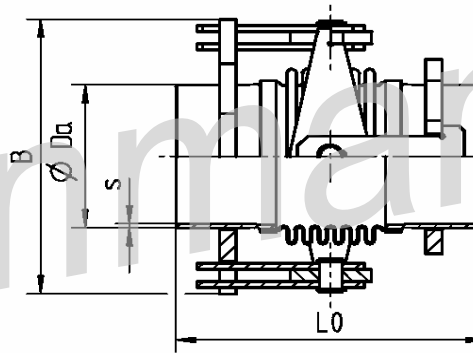


PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRK 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	16	.0050.160.0	210	8	200	60,3	4	90	0,5	27	46	0,5	3,7	0,04	2,9
50	25	.0050.250.0	225	9	200	60,3	4,0	90	0,5	45	46	0,5	2,2	0,1	1,8
50	34	.0050.340.0	250	9	200	60,3	4,0	90	0,5	72	46	0,5	1,4	0,1	1,1
65	16	.0065.160.0	210	9	220	76,1	4,0	90	0,6	30	69,4	0,7	4,9	0,1	5,1
65	25	.0065.250.0	230	10	220	76,1	4,0	90	0,6	50	69,4	0,7	2,9	0,1	3
65	34	.0065.340.0	265	11	220	76,1	4,0	90	0,6	88	70,1	0,7	3,3	0,2	3,1
80	14	.0080.140.0	235	13	235	88,9	4,0	100	0,8	36	89,9	0,9	12	0,1	12
80	23	.0080.230.0	260	13	235	88,9	4,0	100	0,8	60	89,9	0,9	6,9	0,2	7,3
80	32	.0080.320.0	295	13	235	88,9	4,0	100	0,8	96	89,9	0,9	4,3	0,3	4,5
100	15	.0100.150.0	240	15	265	114,3	4,0	100	1,1	39	139	1,4	15	0,2	21
100	24	.0100.240.0	265	15	265	114,3	4,0	100	1,1	65	139	1,4	8,8	0,3	13
100	33	.0100.330.0	305	16	265	114,3	4,0	100	1,1	104	139	1,4	5,5	0,4	8

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 16...



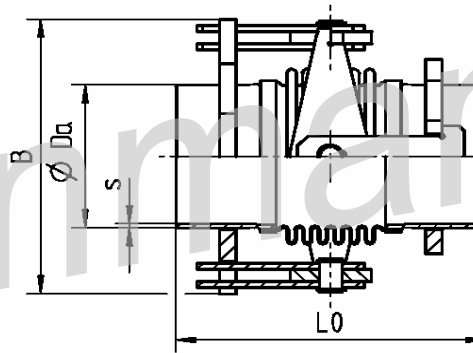
PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRK 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	15	.0125.150.0	260	18	290	139,7	4,0	100	1,3	42	185	1,9	18	0,2	31
125	24	.0125.240.0	285	18	290	139,7	4,0	100	1,3	70	185	1,9	11	0,4	19
125	33	.0125.330.0	335	19	290	139,7	4,0	100	1,3	120	186	1,9	8,1	0,7	14
150	14	.0150.140.0	260	25	325	168,3	4,5	100	1,8	45	264	2,6	25	0,3	52
150	22	.0150.220.0	290	26	325	168,3	4,5	100	1,8	75	264	2,6	15	0,6	31
150	31	.0150.310.0	345	28	325	168,3	4,5	100	1,8	128	266	2,7	11	1,0	23
200	14	.0200.140.0	315	55	425	219,1	6,3	120	3,9	54	441	7,9	63	0,7	161
200	22	.0200.220.0	350	57	425	219,1	6,3	120	3,9	90	441	7,9	38	1,2	96
200	31	.0200.310.0	405	60	425	219,1	6,3	120	3,9	144	441	7,9	24	1,8	60
250	9	.0250.091.0	320	73	485	273,0	7,1	120	5,6	57	674	12,0	160	1,1	238
250	16	.0250.160.0	375	76	485	273,0	7,1	120	5,6	114	674	12,0	80	2,2	119
250	23	.0250.230.0	430	82	485	273,0	7,1	120	5,6	171	677	12,0	67	3,4	99



## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 16...

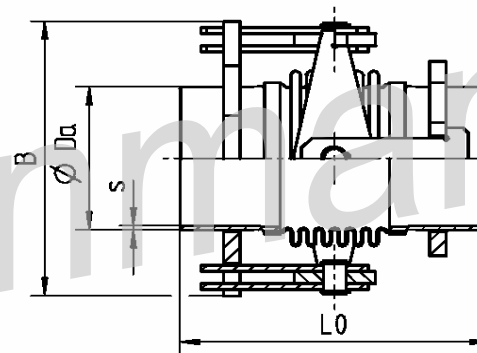


### PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRK 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	10	.0300.096.0	350	102	545	323,9	8,0	130	8,1	63	940	17,0	246	1,7	449
300	15	.0300.150.0	390	106	545	323,9	8,0	130	8,1	105	940	17,0	147	2,9	269
300	22	.0300.220.0	470	113	545	323,9	8,0	130	8,1	189	940	17,0	82	5,2	150
350	9	.0350.088.0	410	125	605	355,6	8,0	160	10,9	63	1128	20,0	288	2,1	580
350	14	.0350.140.0	450	128	605	355,6	8,0	160	10,9	105	1128	20,0	173	3,4	348
350	20	.0350.200.0	530	136	605	355,6	8,0	160	10,9	189	1128	20,0	96	6,2	193
400	15	.0400.150.0	475	202	685	406,4	8,0	160	12,5	130	1476	35,0	310	5,6	731
400	23	.0400.230.0	575	220	685	406,4	8,0	160	12,5	234	1476	35,0	172	10,0	406
450	14	.0450.140.0	475	239	745	457,0	8,0	160	14,1	130	1851	44,0	392	7,0	1020
450	22	.0450.220.0	575	259	745	457,0	8,0	160	14,1	234	1851	44,0	218	13,0	567
500	16	.0500.160.0	530	303	795	508,0	8,0	180	17,6	140	2282	55,0	429	9,3	1302
500	22	.0500.220.0	610	319	795	508,0	8,0	180	17,6	224	2282	55,0	268	15,0	813

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 16...

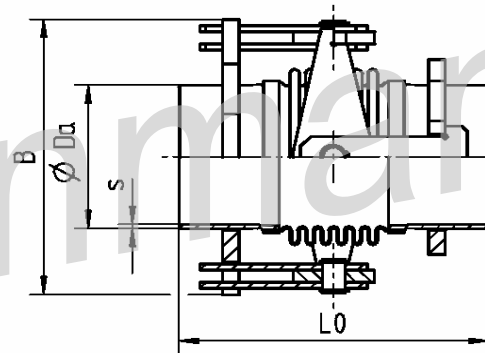


PN 16

Nominal diameter	Nominal angular movement absorption	Type  WRK 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
600	12	.0600.120.0	610	487	945	610,0	8,0	200	23,6	180	3232	97,0	1026	17,0	1888
600	16	.0600.160.0	695	512	945	610,0	8,0	200	23,6	270	3232	97,0	684	25,0	1258
700	16	.0700.160.0	755	694	1065	711,0	10,0	225	38,6	279	4365	131,0	841	35,0	1860
800	15	.0800.150.0	820	1056	1225	813,0	10,0	250	49,2	288	5641	226,0	1136	47,0	2706
900	11	.0900.110.0	835	1519	1390	914,0	10,0	300	66,5	204	7238	362,0	2352	43,0	6471
900	16	.0900.160.0	970	1591	1390	914,0	10,0	300	66,5	340	7238	362,0	1411	72,0	3882
1000	14	.1000.140.0	980	1868	1500	1016,0	10,0	300	74,0	342	8891	445,0	2218	88,0	6461

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 25...

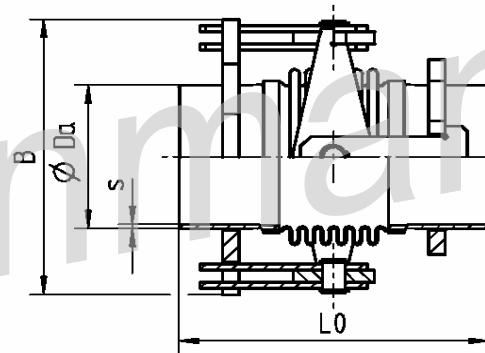


PN 25

Nominal diameter	Nominal angular movement absorption	Type  WRK 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	14	.0050.140.0	210	9	200	60,3	4	90	0,5	30	46,6	0,5	6,9	0,04	4,8
50	22	.0050.220.0	230	10	200	60,3	4,0	90	0,5	50	46,6	0,5	4,2	0,1	2,9
50	30	.0050.300.0	260	10	200	60,3	4,0	90	0,5	80	46,6	0,5	2,6	0,1	1,8
65	15	.0065.150.0	235	11	220	76,1	4,0	100	0,7	33	70,1	0,7	8,8	0,1	8,4
65	23	.0065.230.0	255	12	220	76,1	4,0	100	0,7	55	70,1	0,7	5,3	0,1	5
65	29	.0065.290.0	275	12	220	76,1	4,0	100	0,7	77	70,1	0,7	3,8	0,2	3,6
80	14	.0080.140.0	235	13	235	88,9	4,0	100	0,8	36	90,8	0,9	14	0,1	14
80	22	.0080.220.0	260	13	235	88,9	4,0	100	0,8	60	90,8	0,9	8,3	0,2	8,6
80	28	.0080.280.0	285	13	235	88,9	4,0	100	0,8	84	90,8	0,9	5,9	0,2	6,2
100	14	.0100.140.0	240	18	265	114,3	4,0	100	1,1	39	140	1,4	18	0,2	25
100	22	.0100.220.0	265	18	265	114,3	4,0	100	1,1	65	140	1,4	11	0,3	15
100	27	.0100.270.0	290	19	265	114,3	4,0	100	1,1	91	140	1,4	7,5	0,4	11

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 25...

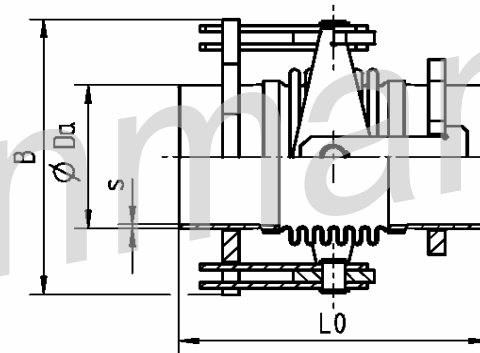


PN 25

Nominal diameter	Nominal angular movement absorption	Type  WRK 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	14	.0125.140.0	265	22	290	139,7	4,0	100	1,3	48	187	1,9	31	0,3	48
125	22	.0125.220.0	295	23	290	139,7	4,0	100	1,3	80	187	1,9	19	0,4	29
125	27	.0125.270.0	325	23	290	139,7	4,0	100	1,3	112	187	1,9	13	0,6	21
150	13	.0150.130.0	305	43	365	168,3	4,5	120	2,2	48	267	4,8	44	0,4	82
150	20	.0150.200.0	335	44	365	168,3	4,5	120	2,2	80	267	4,8	26	0,6	49
150	27	.0150.270.0	385	47	365	168,3	4,5	120	2,2	128	267	4,8	16	1,0	31
200	9	.0200.091.0	335	63	425	219,1	6,3	130	4,3	54	443	8,0	140	0,7	165
200	16	.0200.160.0	390	67	425	219,1	6,3	130	4,3	108	443	8,0	70	1,4	82
200	22	.0200.220.0	440	71	425	219,1	6,3	130	4,3	162	445	8,0	57	2,1	66
250	9	.0250.090.0	340	84	485	273,0	7,1	130	6,0	60	679	12,0	245	1,2	353
250	14	.0250.140.0	380	87	485	273,0	7,1	130	6,0	100	679	12,0	147	2,0	212
250	20	.0250.200.0	440	92	485	273,0	7,1	130	6,0	160	679	12,0	92	3,2	133

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 25...

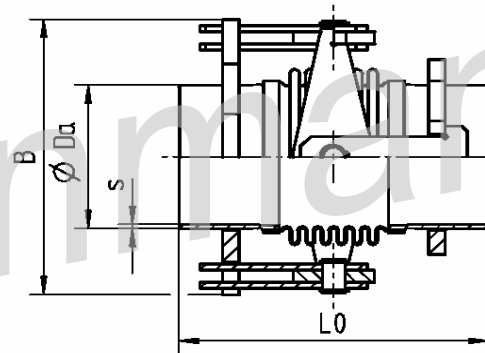


PN 25

Nominal diameter	Nominal angular movement absorption	Type  WRK 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	9	.0300.087.0	410	161	585	323,9	8,0	160	9,9	66	940	23,0	313	1,8	542
300	14	.0300.140.0	455	166	585	323,9	8,0	160	9,9	110	940	23,0	188	3,0	325
300	18	.0300.180.0	520	173	585	323,9	8,0	160	9,9	176	940	23,0	118	4,8	203
350	14	.0350.140.0	505	195	625	355,6	8,0	180	12,3	120	1140	27,0	275	4,0	534
350	20	.0350.200.0	600	209	625	355,6	8,0	180	12,3	216	1140	27,0	153	7,2	297
400	12	.0400.120.0	535	244	685	406,4	8,0	180	14,1	150	1473	35,0	528	6,4	657
400	16	.0400.160.0	605	256	685	406,4	8,0	180	14,1	225	1473	35,0	352	9,6	438
450	12	.0450.120.0	580	383	785	457,0	8,0	200	17,6	156	1847	55,0	668	8,4	910
450	16	.0450.160.0	655	401	785	457,0	8,0	200	17,6	234	1847	55,0	445	13,0	606
500	10	.0500.100.0	585	450	845	508,0	8,0	200	19,6	150	2290	69,0	1166	10,0	1824
500	16	.0500.160.0	705	484	845	508,0	8,0	200	19,6	270	2290	69,0	648	18,0	1013
600	15	.0600.150.0	770	792	1005	610,0	10,0	225	33,1	288	3257	130,0	848	27,0	1615
700	14	.0700.140.0	930	1200	1160	711,0	10,0	300	51,5	297	4371	219,0	1203	38,0	2498

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 40...

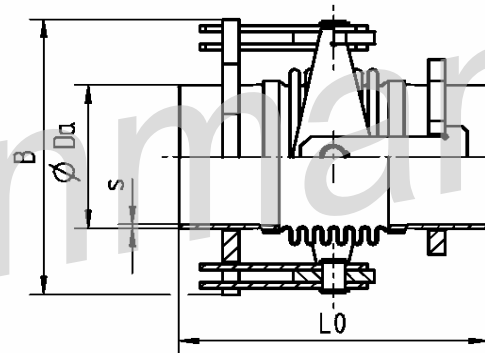


PN 40

Nominal diameter	Nominal angular movement absorption	Type  WRK 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	14	.0050.140.0	235	9	200	60,3	4	100	0,6	33	47,2	0,5	8,7	0,05	5,6
50	21	.0050.210.0	255	10	200	60,3	4,0	100	0,6	55	47,2	0,5	5,2	0,1	3,4
50	25	.0050.250.0	275	10	200	60,3	4,0	100	0,6	77	47,2	0,5	3,7	0,1	2,4
65	12	.0065.120.0	235	12	220	76,1	4,0	100	0,7	36	71,6	0,7	16	0,1	13
65	19	.0065.190.0	260	12	220	76,1	4,0	100	0,7	60	71,6	0,7	9,6	0,1	7,8
65	26	.0065.260.0	295	13	220	76,1	4,0	100	0,7	96	71,6	0,7	6	0,2	4,9
80	13	.0080.130.0	240	15	230	88,9	4,0	100	0,8	39	92,5	0,9	19	0,1	18
80	20	.0080.200.0	265	15	230	88,9	4,0	100	0,8	65	92,5	0,9	11	0,2	11
80	24	.0080.240.0	290	16	230	88,9	4,0	100	0,8	91	92,5	0,9	8,2	0,2	7,9
100	8	.0100.077.0	240	19	265	114,3	4,0	100	1,1	39	136	1,4	45	0,2	23
100	12	.0100.120.0	265	20	265	114,3	4,0	100	1,1	65	136	1,4	27	0,3	14
100	17	.0100.170.0	315	21	265	114,3	4,0	100	1,1	117	136	1,4	22	0,5	11

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 40...

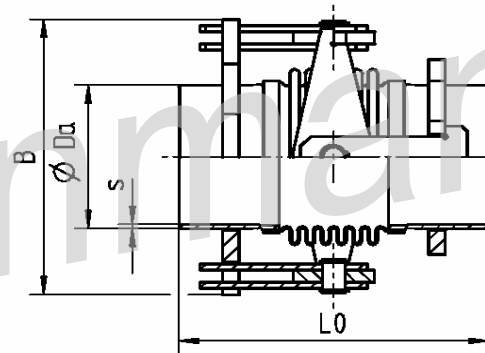


PN 40

Nominal diameter	Nominal angular movement absorption	Type  WRK 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	9	.0125.086.0	305	38	335	139,7	4,0	120	1,6	48	187	3,4	72	0,3	50
125	13	.0125.130.0	335	39	335	139,7	4,0	120	1,6	80	187	3,4	43	0,4	30
125	17	.0125.170.0	365	41	335	139,7	4,0	120	1,6	112	187	3,4	31	0,6	21
150	9	.0150.086.0	325	48	365	168,3	4,5	130	2,3	48	269	4,8	96	0,4	84
150	13	.0150.130.0	355	50	365	168,3	4,5	130	2,3	80	269	4,8	58	0,6	50
150	17	.0150.170.0	385	51	365	168,3	4,5	130	2,3	112	269	4,8	41	0,9	36
200	8	.0200.077.0	340	78	425	219,1	6,3	130	4,3	60	447	8,0	253	0,8	263
200	12	.0200.120.0	380	82	425	219,1	6,3	130	4,3	100	447	8,0	152	1,3	158
200	17	.0200.170.0	440	86	425	219,1	6,3	130	4,3	160	447	8,0	95	2,1	99
250	12	.0250.120.0	445	145	525	273,0	7,1	160	7,4	105	683	16,0	203	2,1	280
250	17	.0250.170.0	505	153	525	273,0	7,1	160	7,4	168	683	16,0	127	3,3	175

## Angular expansion joints with weld ends

Gimbal hinge version      Typ WRK 40...



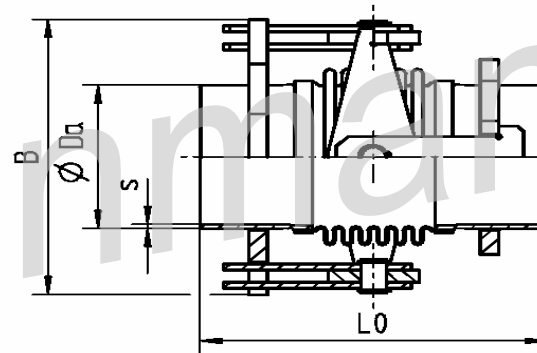
### PN 40

Nominal diameter	Nominal angular movement absorption	Type  WRK 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	9	.0300.092.0	460	199	585	323,9	8,0	160	9,9	115	946	23,0	500	3,2	454
300	14	.0300.140.0	550	212	585	323,9	8,0	160	9,9	207	946	23,0	278	5,7	252
350	10	.0350.097.0	545	298	675	355,6	8,0	200	13,6	120	1140	34,0	530	4,0	564
350	14	.0350.140.0	640	317	675	355,6	8,0	200	13,6	216	1140	34,0	295	7,2	313
400	14	.0400.140.0	665	383	725	406,4	10,0	200	19,4	243	1483	44,0	385	10,0	492
450	13	.0450.130.0	665	472	785	457,0	10,0	200	21,9	232	1863	56,0	644	13,0	875
500	11	.0500.110.0	785	707	895	508,0	10,0	250	30,5	261	2286	91,0	1095	17,0	909



## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 63...

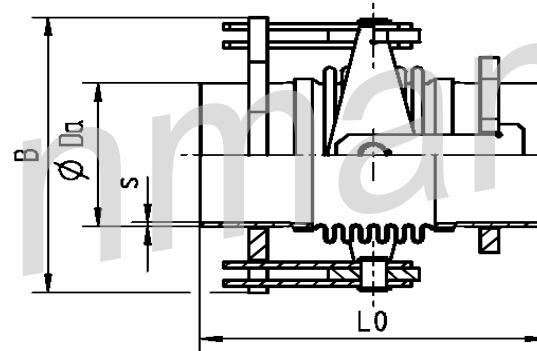


PN 63

Nominal diameter	Nominal angular movement absorption	Type  WRK 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
50	8,9	.0050.089.0	235	11	200	60,3	4,0	100	0,6	32	46,6	0,5	16	0,0	4,8
50	13	.0050.130.0	255	11	200	60,3	4,0	100	0,6	53	46,6	0,5	9,5	0,1	2,9
50	16	.0050.160.0	275	11	200	60,3	4,0	100	0,6	74	46,6	0,5	6,8	0,1	2
65	9	.0065.086.0	235	13	220	76,1	4,0	100	0,7	36	70,9	0,7	28	0,1	11
65	13	.0065.130.0	260	14	220	76,1	4,0	100	0,7	60	70,9	0,7	17	0,1	6,6
65	17	.0065.170.0	295	14	220	76,1	4,0	100	0,7	96	70,9	0,7	11	0,2	4,1
80	8	.0080.082.0	255	17	230	88,9	4,0	110	0,9	36	90,8	0,9	37	0,1	16
80	13	.0080.130.0	280	17	230	88,9	4,0	110	0,9	60	90,8	0,9	22	0,2	9,7
80	16	.0080.160.0	305	18	230	88,9	4,0	110	0,9	84	90,8	0,9	16	0,2	6,9
100	7	.0100.066.0	285	36	305	114,3	5,0	120	1,6	42	137	2,5	86	0,2	39
100	10	.0100.100.0	310	37	305	114,3	5,0	120	1,6	70	137	2,5	52	0,3	24
100	14	.0100.140.0	350	39	305	114,3	5,0	120	1,6	112	137	2,5	32	0,4	15

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 63...

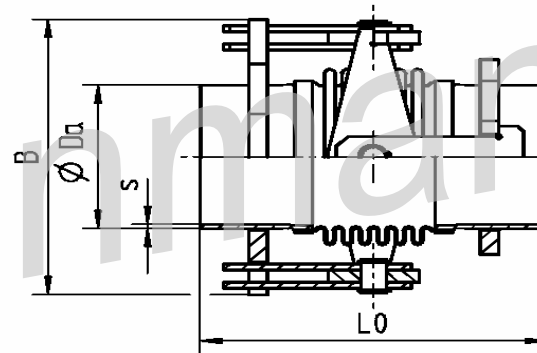


PN 63

Nominal diameter	Nominal angular movement absorption	Type  WRK 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	L <sub>0</sub>	G	B	Da	s	L	G	l <sub>b</sub>	A <sub>e</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
125	8	.0125.084.0	330	45	335	139,7	6,3	130	2,7	51	189	3,4	90	0,3	59
125	11	.0125.110.0	345	45	335	139,7	6,3	130	2,7	68	189	3,4	68	0,4	45
125	16	.0125.160.0	395	48	335	139,7	6,3	130	2,7	119	189	3,4	39	0,7	25
150	7	.0150.071.0	360	61	365	168,3	6,3	140	3,5	57	272	4,9	178	0,5	132
150	11	.0150.110.0	395	63	365	168,3	6,3	140	3,5	95	272	4,9	107	0,8	79
150	14	.0150.140.0	430	65	365	168,3	6,3	140	3,5	133	272	4,9	76	1,1	57
200	5	.0200.053.0	405	126	465	219,1	8,0	160	6,6	63	445	11,0	515	0,8	280
200	10	.0200.099.0	465	133	465	219,1	8,0	160	6,6	126	445	11,0	258	1,6	140
200	13	.0200.130.0	525	140	465	219,1	8,0	160	6,6	189	445	11,0	172	2,4	93
250	8	.0250.081.0	535	204	555	273,0	10,0	200	12,9	115	686	16,0	473	2,3	341
250	12	.0250.120.0	625	216	555	273,0	10,0	200	12,9	207	686	16,0	263	4,1	189

## Angular expansion joints with weld ends

Gimbal hinge version Typ WRK 63...



PN 63

Nominal diameter	Nominal angular movement absorption	Type  WRK 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Spring rates at 20°C per bellows			Torsional rigidity
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area	Friction factor	Angular	Pressure factor	
DN	$2\alpha_N$	-	Lo	G	B	Da	s	L	G	lb	Ae	$c_r$	$c_\alpha$	$c_p$	cT
-	deg	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	Nm/bar	Nm/deg	Nm/deg bar	kNm/deg
300	8	.0300.082.0	550	310	625	323,9	11,0	200	16,9	125	951	29,0	573	3,5	515
300	11	.0300.110.0	625	324	625	323,9	11,0	200	16,9	200	951	29,0	358	5,5	322
350	10	.0350.097.0	655	394	675	355,6	12,0	225	22,7	174	1161	35,0	724	5,9	737
350	13	.0350.130.0	740	414	675	355,6	12,0	225	22,7	261	1161	35,0	483	8,8	491
400	10	.0400.099.0	740	596	785	406,4	15,0	225	32,4	261	1486	59,0	956	11,0	603

## Lateral Expansion Joints

- with swivel lap-joint flanges

Type **LBR** with tie rods

PN 06	page 1	to 5
PN 10	page 6	to 10
PN 16	page 11	to 15
PN 25	page 16	to 19

- with plain fixed flanges

Type **LFR** with tie rods

PN 06	page 1	to 5
PN 10	page 6	to 10
PN 16	page 11	to 15
PN 25	page 16	to 19

- with weld ends

Type **LRR** with tie rods

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PN 16	page 11	to 15
PN 25	page 16	to 19
PN 40	page 20	to 22
PN 63	page 23	to 25

- with weld ends

Type **LRN** for movement in one plane

PN 06	page 1	to 5
PN 10	page 6	to 9
PN 16	page 10	to 12
PN 25	page 13	to 15
PN 40	page 16	to 18
PN 63	page 19	to 20

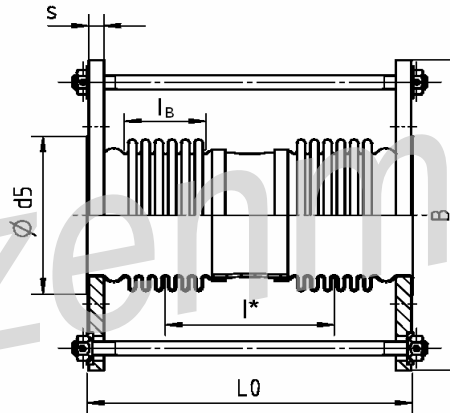
- with weld ends

Type **LRK** for movement in all planes

PN 06	page 1	to 5
PN 10	page 6	to 8
PN 16	page 9	to 11
PN 25	page 12	to 14
PN 40	page 15	to 17
PN 63	page 18	to 19

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 06 ...

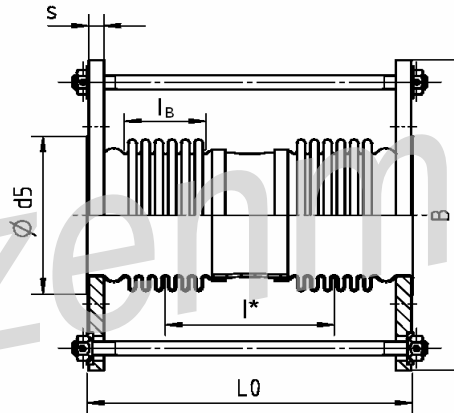


### PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LBR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	51	.0050.051.0	250	7	245	6	90	16	2,1	45	46	136	4,9	14	0	0,9	2	175	2,2	1,8
50	102	.0050.102.0	360	7	245	6	90	16	2,1	45	46	246	3,6	4,2	0	0,9	2	175	2,2	1,8
50	154	.0050.154.0	470	8	245	6	90	16	2,1	45	46	356	2,8	2	0	0,9	2	175	2,2	1,8
50	196	.0050.196.0	560	10	245	6	90	16	2,1	45	46	445	2,4	1,3	0	0,9	2	175	2,2	1,8
65	53	.0065.053.0	260	8	265	6	107	16	2,5	50	69,4	141	7,2	17	0	1,5	2	151	2,9	3
65	104	.0065.104.0	370	8	265	6	107	16	2,5	50	69,4	251	5,3	5,3	0	1,5	2	151	2,9	3
65	151	.0065.151.0	470	9	265	6	107	16	2,5	50	69,4	351	4,3	2,7	0	1,5	2	151	2,9	3
65	204	.0065.204.0	580	10	265	6	107	16	2,5	50	69,4	461	3,5	1,6	0	1,5	2	151	2,9	3
80	53	.0080.053.0	275	11	295	6	122	18	3,8	55	89,1	146	8,9	20	0	2,2	2	154	3,8	4,4
80	102	.0080.102.0	385	11	295	6	122	18	3,8	55	89,1	256	6,6	6,6	0	2,2	2	154	3,8	4,4
80	154	.0080.154.0	495	12	295	6	122	18	3,8	55	89,1	366	5,3	3,2	0	2,2	2	154	3,8	4,4
80	201	.0080.201.0	595	13	295	6	122	18	3,8	55	89,1	466	4,5	2	0	2,2	2	154	3,8	4,4

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 06 ...

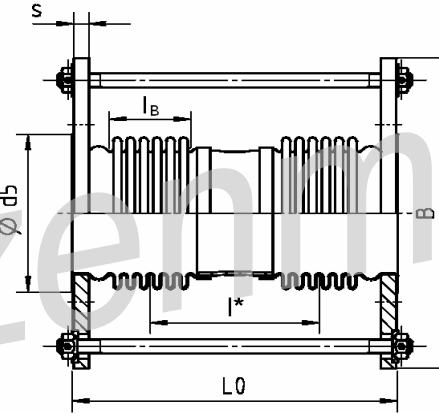


### PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LBR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	52	.0100.052.0	275	12	315	6	147	18	4,2	60	138	141	14	28	0	3,9	2	129	4,9	7,8
100	103	.0100.103.0	385	13	315	6	147	18	4,2	60	138	251	10	8,9	0	3,9	2	129	4,9	7,8
100	151	.0100.151.0	485	13	315	6	147	18	4,2	60	138	351	8,3	4,6	0	3,9	2	129	4,9	7,8
100	204	.0100.204.0	595	14	315	6	147	18	4,2	60	138	461	6,9	2,6	0	3,9	2	129	4,9	7,8
125	51	.0125.051.0	310	15	345	6	178	20	5,7	56	184	167	16	31	0	6,9	2	148	7,6	13,8
125	103	.0125.103.0	450	16	345	6	178	20	5,7	56	184	307	12	9,2	0	6,9	2	148	7,6	13,8
125	153	.0125.153.0	580	21	345	6	178	20	5,7	56	184	421	9,3	4,8	0	6,9	2	148	7,6	13,8
125	203	.0125.203.0	710	23	345	6	178	20	5,7	56	184	551	7,7	2,8	0	6,9	2	148	7,6	13,8
150	53	.0150.053.0	330	19	370	6	202	20	6,2	75	264	166	22	62	0	16	2	205	15	32
150	101	.0150.101.0	450	20	370	6	202	20	6,2	75	264	286	17	21	0	16	2	205	15	32
150	144	.0150.144.0	570	25	370	6	202	20	6,2	75	264	390	14	11	0	16	2	205	15	32
150	195	.0150.195.0	690	28	370	6	202	20	6,2	75	264	510	11	6,5	0	16	2	205	15	32

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 06 ...

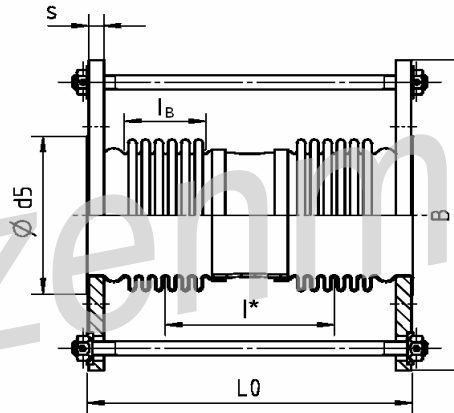


### PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LBR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	d5	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	51	.0200.051.0	345	26	425	6	258	22	8,5	85	436	166	42	95	0	31	2	194	23	62
200	100	.0200.100.0	475	28	425	6	258	22	8,5	85	436	296	32	30	0	31	2	194	23	62
200	153	.0200.153.0	605	39	425	6	258	22	8,5	85	436	405	26	16	0	31	2	194	23	62
200	198	.0200.198.0	730	44	425	6	258	22	8,5	85	436	535	22	9,3	0	31	2	194	23	62
250	50	.0250.050.0	365	37	505	6	312	24	11,9	90	670	171	80	123	0	55	2	169	31	110
250	102	.0250.102.0	505	40	505	6	312	24	11,9	90	670	311	61	37	0	55	2	169	31	110
250	153	.0250.153.0	635	55	505	6	312	24	11,9	90	670	420	50	20	0	55	2	169	31	110
250	212	.0250.212.0	805	65	505	6	312	24	11,9	90	670	590	41	10	0	55	2	169	31	110
300	50	.0300.050.0	380	51	605	6	365	24	16,5	80	932	191	155	146	0	104	2	183	47	208
300	101	.0300.101.0	540	55	605	6	365	24	16,5	80	932	351	115	43	0	104	2	183	47	208
300	152	.0300.152.0	690	59	605	6	365	24	16,5	80	932	501	93	21	0	104	2	183	47	208
300	196	.0300.196.0	840	92	605	6	365	24	16,5	80	932	630	78	14	0	104	2	183	47	208
300	296	.0300.296.0	1140	115	605	6	365	24	16,5	80	932	930	59	6,2	0	104	2	183	47	208

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 06 ...



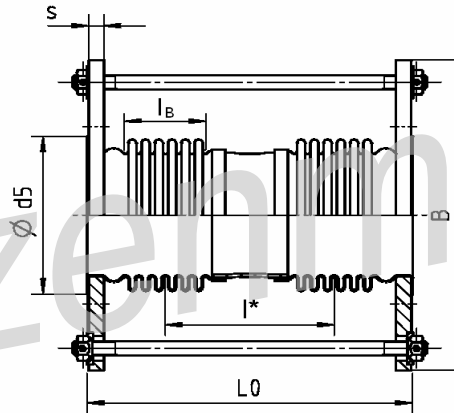
### PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LBR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	d5	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	52	.0350.052.0	410	65	655	6	410	26	22,0	84	1110	215	173	160	0	139	2	212	65	278
350	102	.0350.102.0	580	69	655	6	410	26	22,0	84	1110	385	129	50	0	139	2	212	65	278
350	148	.0350.148.0	755	92	655	6	410	26	22,0	84	1110	534	103	26	0	139	2	212	65	278
350	195	.0350.195.0	905	102	655	6	410	26	22,0	84	1110	684	87	16	0	139	2	212	65	278
350	300	.0350.300.0	1255	125	655	6	410	26	22,0	84	1110	1034	65	6,9	0	139	2	212	65	278
400	51	.0400.051.0	465	86	725	6	465	28	27,2	110	1456	231	251	248	0	143	2	289	117	286
400	100	.0400.100.0	665	107	725	6	465	28	27,2	110	1456	410	187	78	0	143	2	289	117	286
400	158	.0400.158.0	865	123	725	6	465	28	27,2	110	1456	610	149	35	0	143	2	289	117	286
400	200	.0400.200.0	1015	134	725	6	465	28	27,2	110	1456	760	130	23	0	143	2	289	117	286
400	294	.0400.294.0	1415	166	725	6	465	28	27,2	110	1456	1160	96	9,9	0	143	2	289	117	286



## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 06 ...

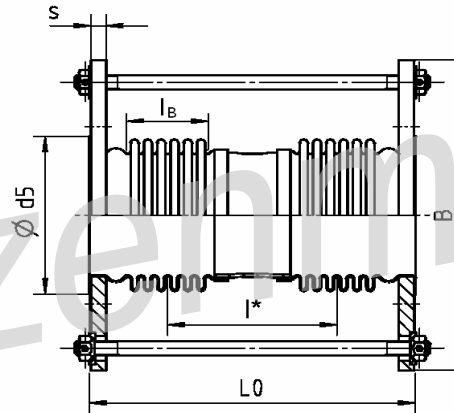


### PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LBR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	d5	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	50	.0450.050.0	475	95	780	6	520	28	30,5	115	1828	236	315	303	0	198	2	293	149	396
450	97	.0450.097.0	675	119	780	6	520	28	30,5	115	1828	415	234	96	0	198	2	293	149	396
450	152	.0450.152.0	875	136	780	6	520	28	30,5	115	1828	615	187	44	0	198	2	293	149	396
450	192	.0450.192.0	1025	149	780	6	520	28	30,5	115	1828	765	160	29	0	198	2	293	149	396
450	289	.0450.289.0	1390	185	780	6	520	28	30,3	120	1832	1120	122	18	0	262	2	391	199	524
500	52	.0500.052.0	495	131	870	6	570	32	39,7	125	2265	236	424	422	0	332	2	331	208	664
500	104	.0500.104.0	710	160	870	6	570	32	39,7	125	2265	425	313	128	0	332	2	331	208	664
500	147	.0500.147.0	860	175	870	6	570	32	39,7	125	2265	575	263	71	0	332	2	331	208	664
500	207	.0500.207.0	1060	195	870	6	570	32	39,7	125	2265	775	219	39	0	332	2	331	208	664
500	289	.0500.289.0	1360	225	870	6	570	32	39,7	125	2265	1075	175	20	0	332	2	331	208	664

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 10 ...

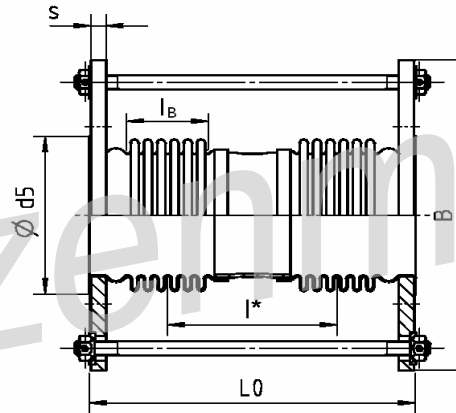


### PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LBR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	51	.0050.051.0	260	10	270	10	92	19	3,5	45	46	136	4,7	13	0	0,9	2	175	2,2	1,8
50	102	.0050.102.0	370	10	270	10	92	19	3,5	45	46	246	3,5	4,1	0	0,9	2	175	2,2	1,8
50	146	.0050.146.0	465	12	270	10	92	19	3,5	45	46	345	2,8	2,1	0	0,9	2	175	2,2	1,8
50	202	.0050.202.0	615	14	270	10	92	19	3,5	45	46	495	2,2	1	0	0,9	2	175	2,2	1,8
65	53	.0065.053.0	270	11	290	10	107	20	4,2	50	69,4	141	6,9	17	0	1,5	2	151	2,9	3
65	104	.0065.104.0	380	12	290	10	107	20	4,2	50	69,4	251	5,2	5,2	0	1,5	2	151	2,9	3
65	146	.0065.146.0	480	12	290	10	107	20	4,2	50	69,4	351	4,2	2,7	0	1,5	2	151	2,9	3
65	201	.0065.201.0	630	13	290	10	107	20	4,2	50	69,4	501	3,3	1,3	0	1,5	2	151	2,9	3
80	53	.0080.053.0	300	14	305	10	122	20	4,7	60	89,9	161	8,2	30	0	3,6	2	278	6,9	7,2
80	101	.0080.101.0	420	14	305	10	122	20	4,7	60	89,9	281	6,1	9,9	0	3,6	2	278	6,9	7,2
80	151	.0080.151.0	540	15	305	10	122	20	4,7	60	89,9	401	4,9	4,9	0	3,6	2	278	6,9	7,2
80	202	.0080.202.0	660	16	305	10	122	20	4,7	60	89,9	521	4,1	2,9	0	3,6	2	278	6,9	7,2

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 10 ...

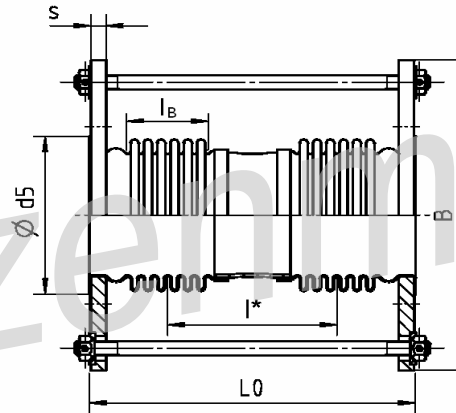


### PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LBR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	290	15	325	10	147	22	5,7	48	138	159	13	27	0	4,9	2	161	6,2	9,8
100	100	.0100.100.0	420	16	325	10	147	22	5,7	48	138	289	9,4	8,3	0	4,9	2	161	6,2	9,8
100	146	.0100.146.0	550	17	325	10	147	22	5,7	48	138	419	7,4	4	0	4,9	2	161	6,2	9,8
100	203	.0100.203.0	730	23	325	10	147	22	5,7	48	138	598	5,7	1,9	0	4,9	2	161	6,2	9,8
125	50	.0125.050.0	315	20	355	10	178	22	7,0	70	185	151	16	53	0	9,3	2	210	11	18,6
125	100	.0125.100.0	435	21	355	10	178	22	7,0	70	185	271	12	17	0	9,3	2	210	11	18,6
125	153	.0125.153.0	555	24	355	10	178	22	7,0	70	185	375	9,9	8,6	0	9,3	2	210	11	18,6
125	200	.0125.200.0	665	26	355	10	178	22	7,0	70	185	485	8,3	5,2	0	9,3	2	210	11	18,6
150	51	.0150.051.0	340	27	390	10	208	24	9,0	80	266	161	26	79	0	18	2	248	18	36
150	102	.0150.102.0	470	28	390	10	208	24	9,0	80	266	291	20	24	0	18	2	248	18	36
150	145	.0150.145.0	590	34	390	10	208	24	9,0	80	266	395	16	13	0	18	2	248	18	36
150	195	.0150.195.0	710	37	390	10	208	24	9,0	80	266	515	14	7,7	0	18	2	248	18	36

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 10 ...

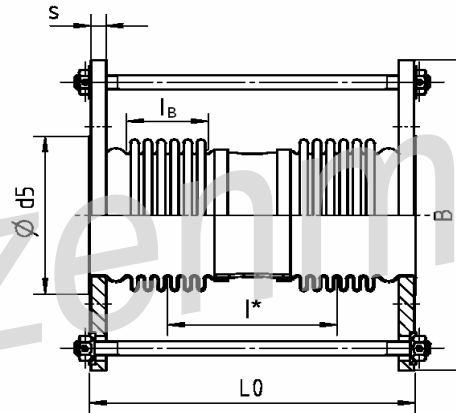


### PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LBR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	52	.0200.052.0	365	36	470	10	258	24	11,9	68	439	199	54	95	0	45	2	275	34	90
200	100	.0200.100.0	515	39	470	10	258	24	11,9	68	439	349	40	31	0	45	2	275	34	90
200	153	.0200.153.0	675	52	470	10	258	24	11,9	68	439	488	32	16	0	45	2	275	34	90
200	206	.0200.206.0	855	60	470	10	258	24	11,9	68	439	668	26	8,5	0	45	2	275	34	90
250	52	.0250.052.0	395	51	560	10	320	26	16,3	76	674	207	110	116	0	80	2	235	44	160
250	101	.0250.101.0	555	65	560	10	320	26	16,3	76	674	346	82	41	0	80	2	235	44	160
250	152	.0250.152.0	715	75	560	10	320	26	16,3	76	674	506	66	19	0	80	2	235	44	160
250	198	.0250.198.0	885	85	560	10	320	26	16,3	76	674	676	54	11	0	80	2	235	44	160
300	51	.0300.051.0	405	71	630	10	370	28	20,7	88	940	199	181	213	0	160	2	287	75	320
300	102	.0300.102.0	565	77	630	10	370	28	20,7	88	940	359	138	66	0	160	2	287	75	320
300	145	.0300.145.0	715	101	630	10	370	28	20,7	88	940	488	115	35	0	160	2	287	75	320
300	196	.0300.196.0	865	114	630	10	370	28	20,7	88	940	638	96	21	0	160	2	287	75	320
300	292	.0300.292.0	1165	138	630	10	370	28	20,7	88	940	938	73	9,7	0	160	2	287	75	320

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 10 ...

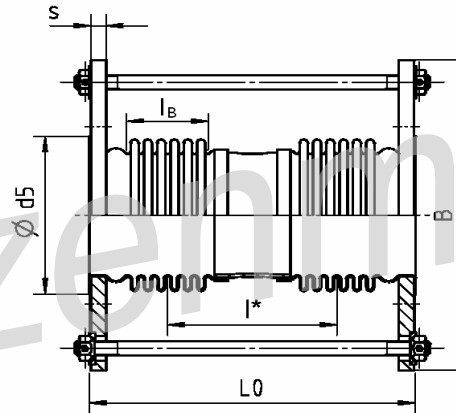


### PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LBR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	50	.0350.050.0	420	86	690	10	410	28	26,9	92	1119	213	207	258	0	214	2	330	103	428
350	100	.0350.100.0	590	93	690	10	410	28	26,9	92	1119	383	160	80	0	214	2	330	103	428
350	149	.0350.149.0	775	115	690	10	410	28	26,9	92	1119	542	127	39	0	214	2	330	103	428
350	195	.0350.195.0	925	126	690	10	410	28	26,9	92	1119	692	108	24	0	214	2	330	103	428
350	296	.0350.296.0	1275	151	690	10	410	28	26,9	92	1119	1042	81	11	0	214	2	330	103	428
400	51	.0400.051.0	515	145	790	10	465	37	44,0	120	1466	251	266	428	0	282	2	584	238	564
400	106	.0400.106.0	760	171	790	10	465	37	44,0	120	1466	470	193	119	0	282	2	584	238	564
400	146	.0400.146.0	910	184	790	10	465	37	44,0	120	1466	620	163	69	0	282	2	584	238	564
400	200	.0400.200.0	1110	201	790	10	465	37	44,0	120	1466	820	137	40	0	282	2	584	238	564
400	287	.0400.287.0	1460	230	790	10	465	37	44,0	120	1466	1170	108	20	0	282	2	584	238	564

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 10 ...

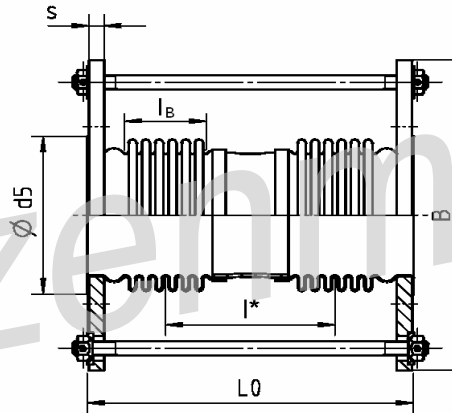


### PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LBR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	51	.0450.051.0	505	171	760	10	520	32	50,6	125	1844	246	297	543	0	385	4	564	289	770
450	98	.0450.098.0	710	205	760	10	520	32	50,6	125	1844	425	225	176	0	385	4	564	289	770
450	153	.0450.153.0	910	230	760	10	520	32	50,6	125	1844	625	181	83	0	385	4	564	289	770
450	195	.0450.195.0	1060	248	760	10	520	32	50,6	125	1844	775	159	54	0	385	4	564	289	770
450	285	.0450.285.0	1410	293	760	10	520	32	50,6	125	1844	1125	121	26	0	385	4	564	289	770
500	51	.0500.051.0	510	194	810	10	570	34	59,0	135	2273	236	367	642	0	492	4	500	316	984
500	105	.0500.105.0	735	233	810	10	570	34	59,0	135	2273	435	271	184	0	492	4	500	316	984
500	148	.0500.148.0	885	253	810	10	570	34	59,0	135	2273	585	227	103	0	492	4	500	316	984
500	207	.0500.207.0	1085	280	810	10	570	34	59,0	135	2273	785	189	58	0	492	4	500	316	984
500	306	.0500.306.0	1485	335	810	10	570	34	59,0	135	2273	1185	142	25	0	492	4	500	316	984

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 16 ...

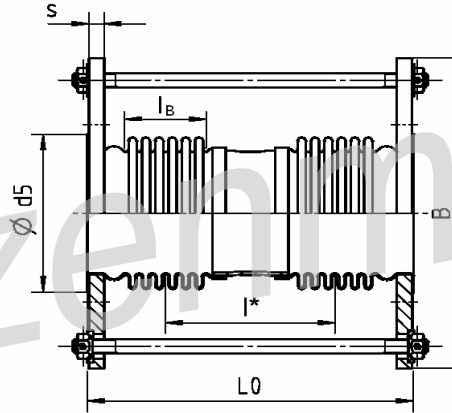


### PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LBR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	50	.0050.050.0	280	10	270	16	92	19	3,5	50	46,6	151	4,5	20	0	1,4	2	321	4,2	2,8
50	103	.0050.103.0	410	11	270	16	92	19	3,5	50	46,6	281	3,2	5,9	0	1,4	2	321	4,2	2,8
50	149	.0050.149.0	530	13	270	16	92	19	3,5	50	46,6	400	2,6	2,9	0	1,4	2	321	4,2	2,8
50	199	.0050.199.0	680	14	270	16	92	19	3,5	50	46,6	550	2	1,5	0	1,4	2	321	4,2	2,8
65	53	.0065.053.0	290	12	290	16	107	20	4,2	55	70,1	156	6,6	25	0	2,5	2	272	5,3	5
65	104	.0065.104.0	410	13	290	16	107	20	4,2	55	70,1	276	4,9	7,8	0	2,5	2	272	5,3	5
65	145	.0065.145.0	520	14	290	16	107	20	4,2	55	70,1	386	3,9	4	0	2,5	2	272	5,3	5
65	198	.0065.198.0	680	15	290	16	107	20	4,2	55	70,1	546	3,1	2	0	2,5	2	272	5,3	5
80	51	.0080.051.0	300	14	305	16	122	20	4,7	60	90,8	161	8,3	36	0	4,3	2	329	8,3	8,6
80	102	.0080.102.0	430	15	305	16	122	20	4,7	60	90,8	291	6,1	11	0	4,3	2	329	8,3	8,6
80	150	.0080.150.0	550	16	305	16	122	20	4,7	60	90,8	411	4,8	5,5	0	4,3	2	329	8,3	8,6
80	205	.0080.205.0	720	20	305	16	122	20	4,7	60	90,8	580	3,8	2,8	0	4,3	2	329	8,3	8,6

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 16 ...



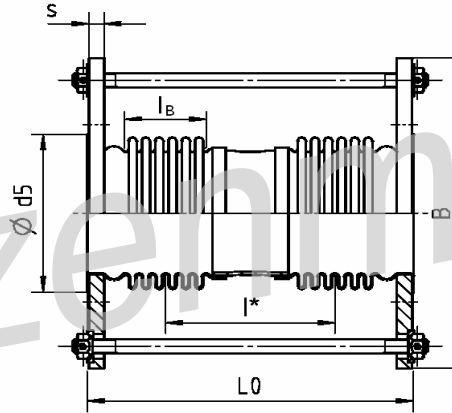
### PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LBR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	310	16	325	16	147	22	5,7	52	139	173	12	41	0	8	2	283	11	16
100	103	.0100.103.0	460	18	325	16	147	22	5,7	52	139	323	8,7	12	0	8	2	283	11	16
100	145	.0100.145.0	590	19	325	16	147	22	5,7	52	139	453	6,9	6	0	8	2	283	11	16
100	202	.0100.202.0	790	25	325	16	147	22	5,7	52	139	652	5,3	2,9	0	8	2	283	11	16
125	53	.0125.053.0	345	22	355	16	178	22	6,8	80	187	171	18	72	0	14	2	360	19	28
125	102	.0125.102.0	475	24	355	16	178	22	6,8	80	187	301	14	23	0	14	2	360	19	28
125	151	.0125.151.0	595	28	355	16	178	22	6,8	80	187	405	11	13	0	14	2	360	19	28
125	196	.0125.196.0	715	30	355	16	178	22	6,8	80	187	525	9,5	7,6	0	14	2	360	19	28
150	53	.0150.053.0	360	32	415	16	208	24	9,6	80	267	181	33	90	0	25	2	352	26	50
150	100	.0150.100.0	490	34	415	16	208	24	9,6	80	267	311	25	31	0	25	2	352	26	50
150	147	.0150.147.0	630	40	415	16	208	24	9,6	80	267	435	20	15	0	25	2	352	26	50
150	190	.0150.190.0	760	43	415	16	208	24	9,6	80	267	565	17	9,2	0	25	2	352	26	50



## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 16 ...

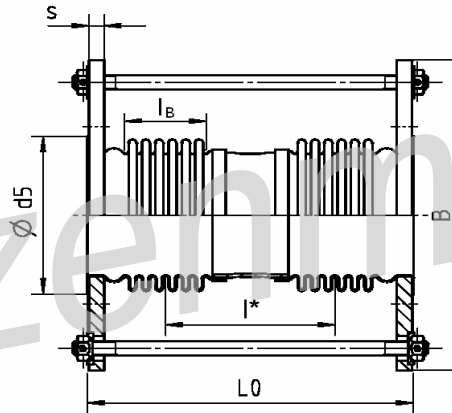


### PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LBR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	50	.0200.050.0	365	45	505	16	258	26	13,9	72	441	193	75	145	0	60	2	386	47	120
200	100	.0200.100.0	525	50	505	16	258	26	13,9	72	441	353	55	43	0	60	2	386	47	120
200	150	.0200.150.0	675	63	505	16	258	26	13,9	72	441	482	45	23	0	60	2	386	47	120
200	200	.0200.200.0	865	71	505	16	258	26	13,9	72	441	672	36	12	0	60	2	386	47	120
250	52	.0250.052.0	465	76	590	16	320	32	22,6	95	677	246	117	226	0	89	2	644	121	178
250	103	.0250.103.0	685	96	590	16	320	32	22,6	95	677	445	85	68	0	89	2	644	121	178
250	154	.0250.154.0	885	109	590	16	320	32	22,6	95	677	645	68	33	0	89	2	644	121	178
250	207	.0250.207.0	1135	125	590	16	320	32	22,6	95	677	895	55	17	0	89	2	644	121	178
300	50	.0300.050.0	500	116	685	16	375	37	32,8	105	940	235	176	281	0	135	2	564	147	270
300	95	.0300.095.0	670	131	685	16	375	37	32,8	105	940	405	136	99	0	135	2	564	147	270
300	145	.0300.145.0	870	149	685	16	375	37	32,8	105	940	605	109	45	0	135	2	564	147	270
300	196	.0300.196.0	1120	170	685	16	375	37	32,8	105	940	855	88	23	0	135	2	564	147	270
300	296	.0300.296.0	1620	214	685	16	375	37	32,8	105	940	1355	63	9,1	0	135	2	564	147	270

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 16 ...

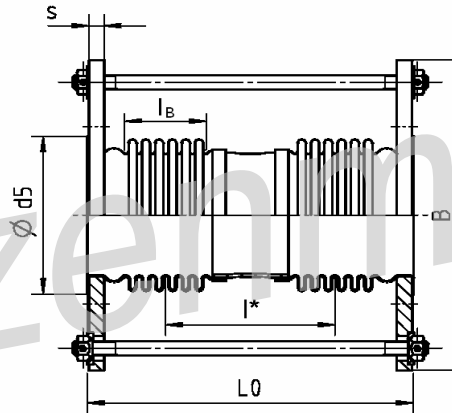


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LBR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	51	.0350.051.0	520	158	670	16	410	32	45,1	110	1131	260	182	330	0	207	4	665	209	414
350	100	.0350.100.0	720	179	670	16	410	32	45,1	110	1131	460	138	110	0	207	4	665	209	414
350	149	.0350.149.0	920	200	670	16	410	32	45,1	110	1131	660	111	54	0	207	4	665	209	414
350	199	.0350.199.0	1170	227	670	16	410	32	45,1	110	1131	910	88	28	0	207	4	665	209	414
350	306	.0350.306.0	1720	284	670	16	410	32	45,1	110	1131	1460	62	11	0	207	4	665	209	414
400	52	.0400.052.0	555	193	725	16	465	34	53,0	130	1476	260	224	478	0	366	4	757	310	732
400	94	.0400.094.0	725	213	725	16	465	34	53,0	130	1476	430	176	184	0	366	4	757	310	732
400	147	.0400.147.0	925	236	725	16	465	34	53,0	130	1476	630	142	87	0	366	4	757	310	732
400	200	.0400.200.0	1125	259	725	16	465	34	53,0	130	1476	830	119	50	0	366	4	757	310	732
400	309	.0400.309.0	1625	317	725	16	465	34	53,0	130	1476	1330	85	20	0	366	4	757	310	732

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 16 ...

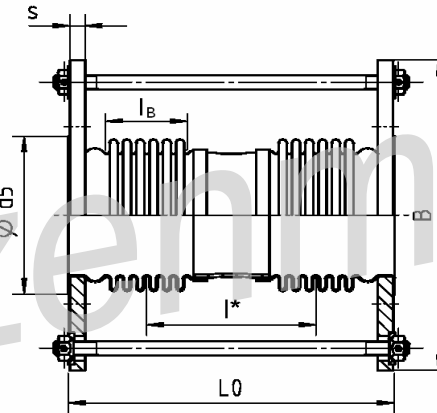


### PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LBR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	50	.0450.050.0	560	258	820	16	520	37	72,8	130	1851	260	307	608	0	510	4	763	392	1020
450	104	.0450.104.0	780	288	820	16	520	37	72,8	130	1851	480	233	188	0	510	4	763	392	1020
450	155	.0450.155.0	980	316	820	16	520	37	72,8	130	1851	680	192	95	0	510	4	763	392	1020
450	203	.0450.203.0	1180	343	820	16	520	37	72,8	130	1851	880	163	57	0	510	4	763	392	1020
450	296	.0450.296.0	1630	405	820	16	520	37	72,8	130	1851	1330	122	25	0	510	4	763	392	1020

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 25 ...

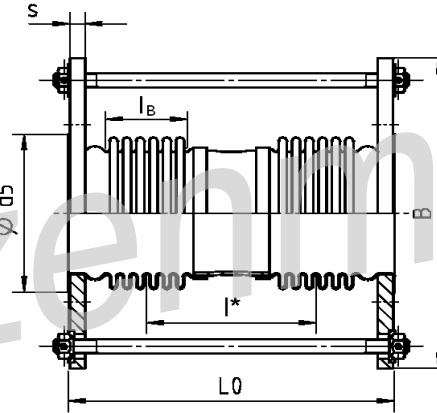


### PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LBR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	50	.0050.050.0	290	11	270	25	92	20	3,6	55	47,2	156	4,4	24	0	1,7	2	398	5,2	3,4
50	98	.0050.098.0	420	12	270	25	92	20	3,6	55	47,2	286	3,2	7,1	0	1,7	2	398	5,2	3,4
50	148	.0050.148.0	590	14	270	25	92	20	3,6	55	47,2	455	2,4	2,8	0	1,7	2	398	5,2	3,4
50	205	.0050.205.0	790	16	270	25	92	20	3,6	55	47,2	655	1,8	1,4	0	1,7	2	398	5,2	3,4
65	51	.0065.051.0	315	14	290	25	107	22	4,7	44	70,9	185	6,3	26	0	3,7	2	407	8	7,4
65	99	.0065.099.0	465	15	290	25	107	22	4,7	44	70,9	335	4,4	8	0	3,7	2	407	8	7,4
65	153	.0065.153.0	665	16	290	25	107	22	4,7	44	70,9	535	3,2	3,1	0	3,7	2	407	8	7,4
65	195	.0065.195.0	825	20	290	25	107	22	4,7	44	70,9	694	2,6	1,9	0	3,7	2	407	8	7,4
80	52	.0080.052.0	330	17	305	25	122	24	5,6	65	92,5	176	7,8	41	0	5,5	2	445	11	11
80	103	.0080.103.0	470	20	305	25	122	24	5,6	65	92,5	315	5,7	13	0	5,5	2	445	11	11
80	155	.0080.155.0	640	22	305	25	122	24	5,6	65	92,5	485	4,3	5,4	0	5,5	2	445	11	11
80	193	.0080.193.0	780	24	305	25	122	24	5,6	65	92,5	625	3,6	3,2	0	5,5	2	445	11	11

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 25 ...

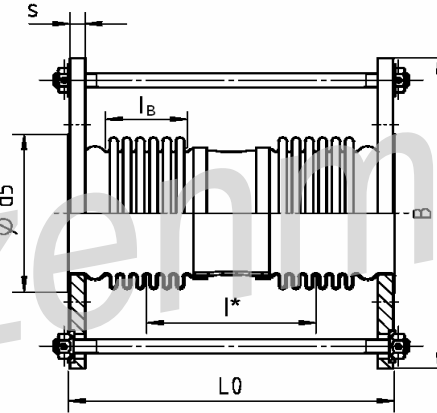


### PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LBR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	340	22	340	25	147	24	7,1	56	141	197	14	56	0	13	2	490	19	26
100	102	.0100.102.0	510	27	340	25	147	24	7,1	56	141	366	9,7	16	0	13	2	490	19	26
100	144	.0100.144.0	670	30	340	25	147	24	7,1	56	141	526	7,6	7,8	0	13	2	490	19	26
100	192	.0100.192.0	855	33	340	25	147	24	7,1	56	141	711	6,1	4,3	0	13	2	490	19	26
125	51	.0125.051.0	360	32	400	25	178	26	10,5	64	187	195	23	70	0	18	2	450	23	36
125	102	.0125.102.0	520	34	400	25	178	26	10,5	64	187	355	17	21	0	18	2	450	23	36
125	153	.0125.153.0	710	40	400	25	178	26	10,5	64	187	529	13	9,4	0	18	2	450	23	36
125	196	.0125.196.0	895	44	400	25	178	26	10,5	64	187	714	10	5,2	0	18	2	450	23	36
150	51	.0150.051.0	375	43	465	25	208	28	13,8	64	267	205	44	88	0	31	2	440	33	62
150	102	.0150.102.0	545	47	465	25	208	28	13,8	64	267	375	33	26	0	31	2	440	33	62
150	146	.0150.146.0	745	56	465	25	208	28	13,8	64	267	559	25	12	0	31	2	440	33	62
150	194	.0150.194.0	950	62	465	25	208	28	13,8	64	267	764	20	6,3	0	31	2	440	33	62

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 25 ...

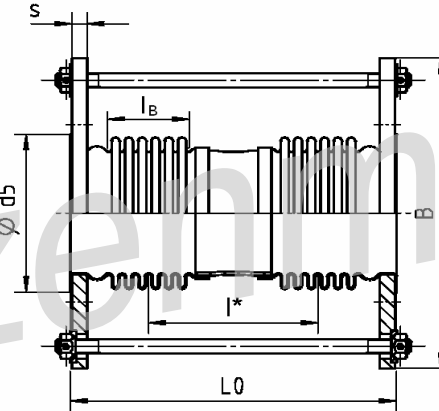


### PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LBR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	d5	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	50	.0200.050.0	445	70	545	25	258	32	20,7	90	445	241	79	199	0	59	2	828	102	118
200	101	.0200.101.0	645	84	545	25	258	32	20,7	90	445	420	59	64	0	59	2	828	102	118
200	155	.0200.155.0	915	97	545	25	258	32	20,7	90	445	690	44	24	0	59	2	828	102	118
200	195	.0200.195.0	1115	108	545	25	258	32	20,7	90	445	890	36	15	0	59	2	828	102	118
250	51	.0250.051.0	480	130	580	25	320	35	40,1	100	679	251	113	266	0	106	4	779	147	212
250	101	.0250.101.0	700	153	580	25	320	35	40,1	100	679	450	83	81	0	106	4	779	147	212
250	149	.0250.149.0	950	173	580	25	320	35	40,1	100	679	700	64	34	0	106	4	779	147	212
250	204	.0250.204.0	1250	198	580	25	320	35	40,1	100	679	1000	50	17	0	106	4	779	147	212
300	61	.0300.061.0	620	178	635	25	375	38	48,6	115	946	340	131	241	0	215	4	982	258	430
300	110	.0300.110.0	845	201	635	25	375	38	48,6	115	946	565	99	90	0	215	4	982	258	430
300	150	.0300.150.0	1045	220	635	25	375	38	48,6	115	946	765	82	49	0	215	4	982	258	430
300	200	.0300.200.0	1345	250	635	25	375	38	48,6	115	946	1065	65	26	0	215	4	982	258	430
300	302	.0300.302.0	1945	309	635	25	375	38	48,6	115	946	1665	46	10	0	215	4	982	258	430

## Lateral expansion joints with swivel lap-joint flanges

For movement in all planes Type LBR 25 ...

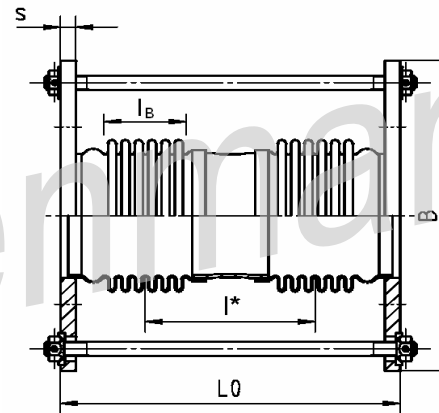


### PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LBR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	rim diameter	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	d5	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	50	.0350.050.0	550	248	740	25	410	42	76,4	120	1140	260	194	430	0	267	4	867	275	534
350	100	.0350.100.0	760	273	740	25	410	42	76,4	120	1140	470	147	138	0	267	4	867	275	534
350	145	.0350.145.0	960	297	740	25	410	42	76,4	120	1140	670	120	68	0	267	4	867	275	534
350	190	.0350.190.0	1210	326	740	25	410	42	76,4	120	1140	920	99	36	0	267	4	867	275	534
350	291	.0350.291.0	1760	390	740	25	410	42	76,4	120	1140	1470	70	14	0	267	4	867	275	534

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 06 ...



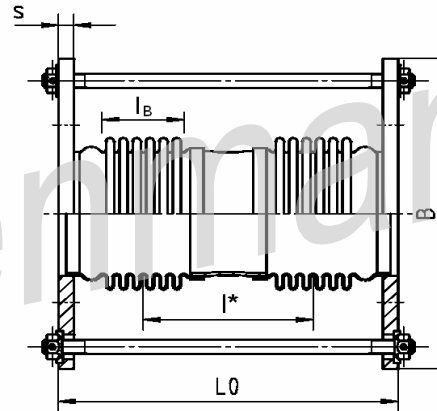
PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LFR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	51	.0050.051.0	265	7	245	6	16	2,1	45	46	136	4,6	14	0	0,9	2	175	2,2	1,8
50	102	.0050.102.0	375	8	245	6	16	2,1	45	46	246	3,4	4,2	0	0,9	2	175	2,2	1,8
50	154	.0050.154.0	485	9	245	6	16	2,1	45	46	356	2,7	2	0	0,9	2	175	2,2	1,8
50	196	.0050.196.0	575	10	245	6	16	2,1	45	46	445	2,4	1,3	0	0,9	2	175	2,2	1,8
65	53	.0065.053.0	275	9	265	6	16	2,5	50	69,4	141	6,7	17	0	1,5	2	151	2,9	3
65	104	.0065.104.0	385	9	265	6	16	2,5	50	69,4	251	5	5,2	0	1,5	2	151	2,9	3
65	151	.0065.151.0	485	9	265	6	16	2,5	50	69,4	351	4,1	2,7	0	1,5	2	151	2,9	3
65	204	.0065.204.0	595	10	265	6	16	2,5	50	69,4	461	3,4	1,5	0	1,5	2	151	2,9	3
80	53	.0080.053.0	285	12	295	6	18	3,8	55	89,1	146	8,4	20	0	2,2	2	154	3,8	4,4
80	102	.0080.102.0	395	12	295	6	18	3,8	55	89,1	256	6,3	6,6	0	2,2	2	154	3,8	4,4
80	154	.0080.154.0	505	12	295	6	18	3,8	55	89,1	366	5,1	3,2	0	2,2	2	154	3,8	4,4
80	201	.0080.201.0	605	15	295	6	18	3,8	55	89,1	466	4,3	2	0	2,2	2	154	3,8	4,4



## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 06 ...

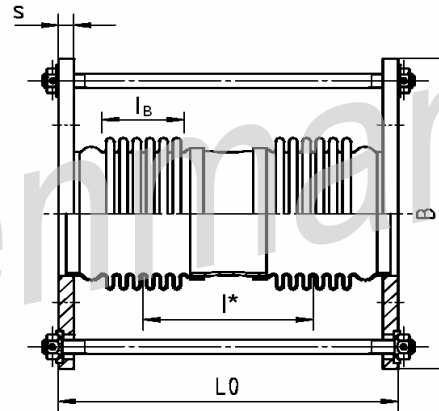


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LFR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	52	.0100.052.0	285	12	315	6	18	4,2	60	138	141	13	29	0	3,9	2	129	4,9	7,8
100	103	.0100.103.0	395	15	315	6	18	4,2	60	138	251	9,8	9	0	3,9	2	129	4,9	7,8
100	151	.0100.151.0	495	15	315	6	18	4,2	60	138	351	8	4,6	0	3,9	2	129	4,9	7,8
100	204	.0100.204.0	605	15	315	6	18	4,2	60	138	461	6,7	2,7	0	3,9	2	129	4,9	7,8
125	51	.0125.051.0	320	18	345	6	20	5,7	56	184	167	16	31	0	6,9	2	148	7,6	13,8
125	103	.0125.103.0	460	18	345	6	20	5,7	56	184	307	12	9,2	0	6,9	2	148	7,6	13,8
125	153	.0125.153.0	590	19	345	6	20	5,7	56	184	437	9,2	4,5	0	6,9	2	148	7,6	13,8
125	203	.0125.203.0	720	23	345	6	20	5,7	56	184	551	7,6	2,8	0	6,9	2	148	7,6	13,8
150	53	.0150.053.0	340	23	370	6	20	6,2	75	264	166	22	62	0	16	2	205	15	32
150	101	.0150.101.0	460	23	370	6	20	6,2	75	264	286	17	21	0	16	2	205	15	32
150	151	.0150.151.0	580	26	370	6	20	6,2	75	264	406	13	10	0	16	2	205	15	32
150	202	.0150.202.0	700	28	370	6	20	6,2	75	264	510	11	6,5	0	16	2	205	15	32

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 06 ...

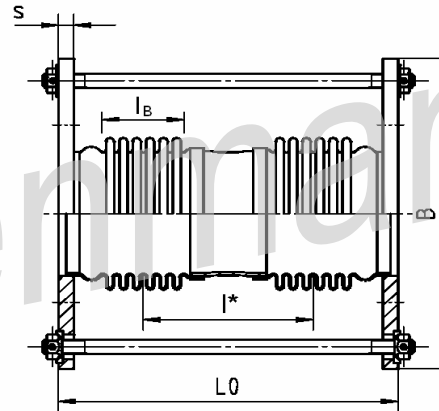


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LFR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	51	.0200.051.0	350	31	425	6	22	8,5	85	436	166	41	97	0	31	2	194	23	62
200	100	.0200.100.0	480	34	425	6	22	8,5	85	436	296	32	30	0	31	2	194	23	62
200	153	.0200.153.0	610	37	425	6	22	8,5	85	436	426	26	15	0	31	2	194	23	62
200	198	.0200.198.0	740	43	425	6	22	8,5	85	436	535	22	9,2	0	31	2	194	23	62
250	50	.0250.050.0	375	44	505	6	24	11,9	90	670	171	80	120	0	55	2	169	31	110
250	102	.0250.102.0	515	47	505	6	24	11,9	90	670	311	61	37	0	55	2	169	31	110
250	153	.0250.153.0	645	52	505	6	24	11,9	90	670	441	50	18	0	55	2	169	31	110
250	212	.0250.212.0	810	63	505	6	24	11,9	90	670	590	41	10	0	55	2	169	31	110
300	50	.0300.050.0	385	59	605	6	24	16,5	80	932	191	155	146	0	104	2	183	47	208
300	101	.0300.101.0	545	65	605	6	24	16,5	80	932	351	115	44	0	104	2	183	47	208
300	152	.0300.152.0	695	71	605	6	24	16,5	80	932	501	93	21	0	104	2	183	47	208
300	196	.0300.196.0	845	90	605	6	24	16,5	80	932	630	77	14	0	104	2	183	47	208
300	296	.0300.296.0	1145	113	605	6	24	16,5	80	932	930	59	6,2	0	104	2	183	47	208

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 06 ...

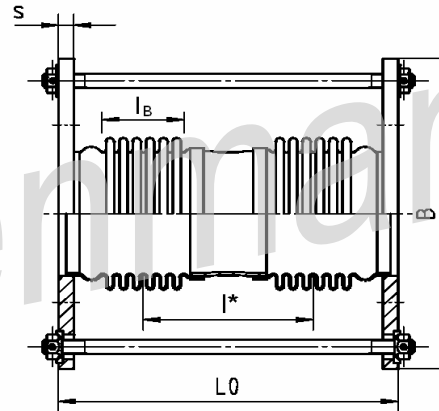


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LFR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	52	.0350.052.0	415	73	655	6	26	22,0	84	1110	215	173	159	0	139	2	212	65	278
350	102	.0350.102.0	585	79	655	6	26	22,0	84	1110	385	129	50	0	139	2	212	65	278
350	148	.0350.148.0	755	90	655	6	26	22,0	84	1110	534	102	26	0	139	2	212	65	278
350	195	.0350.195.0	905	100	655	6	26	22,0	84	1110	684	87	16	0	139	2	212	65	278
350	300	.0350.300.0	1255	123	655	6	26	22,0	84	1110	1034	64	6,9	0	139	2	212	65	278
400	51	.0400.051.0	460	98	725	6	28	27,2	110	1456	231	251	250	0	143	2	289	117	286
400	100	.0400.100.0	665	105	725	6	28	27,2	110	1456	410	187	77	0	143	2	289	117	286
400	158	.0400.158.0	865	120	725	6	28	27,2	110	1456	610	149	35	0	143	2	289	117	286
400	200	.0400.200.0	1015	132	725	6	28	27,2	110	1456	760	130	23	0	143	2	289	117	286
400	294	.0400.294.0	1415	163	725	6	28	27,2	110	1456	1160	96	9,8	0	143	2	289	117	286

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 06 ...

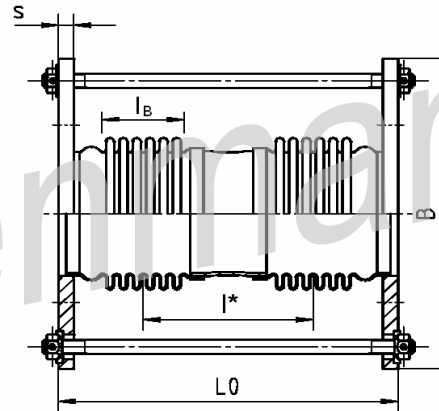


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LFR 06 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	50	.0450.050.0	470	109	780	6	28	30,5	115	1828	236	315	305	0	198	2	293	149	396
450	97	.0450.097.0	675	116	780	6	28	30,5	115	1828	415	234	96	0	198	2	293	149	396
450	152	.0450.152.0	875	133	780	6	28	30,5	115	1828	615	187	44	0	198	2	293	149	396
450	192	.0450.192.0	1025	146	780	6	28	30,5	115	1828	765	160	29	0	198	2	293	149	396
450	289	.0450.289.0	1385	181	780	6	28	30,3	120	1832	1120	122	18	0	262	2	391	199	524
500	52	.0500.052.0	490	154	870	6	32	39,7	125	2265	236	424	424	0	332	2	331	208	664
500	104	.0500.104.0	705	155	870	6	32	39,7	125	2265	425	313	128	0	332	2	331	208	664
500	147	.0500.147.0	855	169	870	6	32	39,7	125	2265	575	268	71	0	332	2	331	208	664
500	207	.0500.207.0	1055	190	870	6	32	39,7	125	2265	775	223	39	0	332	2	331	208	664
500	289	.0500.289.0	1355	220	870	6	32	39,7	125	2265	1075	178	20	0	332	2	331	208	664

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 10 ...

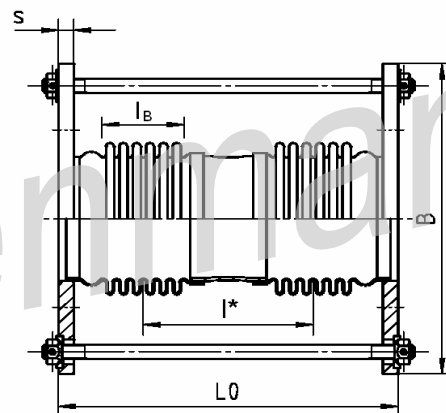


PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LFR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	51	.0050.051.0	270	10	270	10	19	3,5	45	46	136	4,6	13	0	0,9	2	175	2,2	1,8
50	102	.0050.102.0	380	11	270	10	19	3,5	45	46	246	3,4	4,1	0	0,9	2	175	2,2	1,8
50	146	.0050.146.0	475	12	270	10	19	3,5	45	46	345	2,8	2,1	0	0,9	2	175	2,2	1,8
50	202	.0050.202.0	625	13	270	10	19	3,5	45	46	495	2,2	1	0	0,9	2	175	2,2	1,8
65	53	.0065.053.0	280	12	290	10	20	4,2	50	69,4	141	6,7	16	0	1,5	2	151	2,9	3
65	104	.0065.104.0	390	13	290	10	20	4,2	50	69,4	251	5	5,2	0	1,5	2	151	2,9	3
65	146	.0065.146.0	490	13	290	10	20	4,2	50	69,4	351	4,1	2,7	0	1,5	2	151	2,9	3
65	201	.0065.201.0	640	16	290	10	20	4,2	50	69,4	501	3,2	1,3	0	1,5	2	151	2,9	3
80	53	.0080.053.0	310	16	305	10	20	4,7	60	89,9	161	8	30	0	3,6	2	278	6,9	7,2
80	101	.0080.101.0	430	16	305	10	20	4,7	60	89,9	281	6	9,9	0	3,6	2	278	6,9	7,2
80	151	.0080.151.0	550	18	305	10	20	4,7	60	89,9	401	4,8	4,8	0	3,6	2	278	6,9	7,2
80	202	.0080.202.0	670	19	305	10	20	4,7	60	89,9	521	4	2,9	0	3,6	2	278	6,9	7,2

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 10 ...

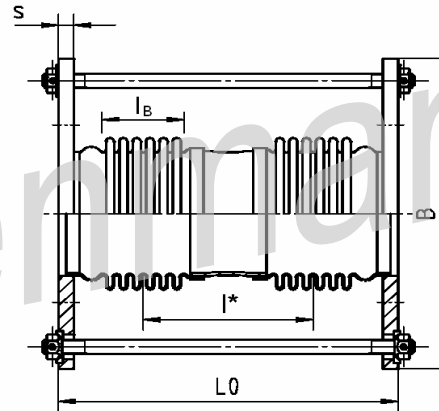


**PN 10**

Nominal diameter	Nominal lateral movement absorption	Type  LFR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	300	15	325	10	22	5,7	48	138	159	13	27	0	4,9	2	161	6,2	9,8
100	100	.0100.100.0	430	18	325	10	22	5,7	48	138	289	9,2	8,3	0	4,9	2	161	6,2	9,8
100	146	.0100.146.0	560	19	325	10	22	5,7	48	138	419	7,2	3,9	0	4,9	2	161	6,2	9,8
100	203	.0100.203.0	740	22	325	10	22	5,7	48	138	598	5,6	1,9	0	4,9	2	161	6,2	9,8
125	50	.0125.050.0	320	23	355	10	22	7,0	70	185	151	16	54	0	9,3	2	210	11	18,6
125	100	.0125.100.0	440	23	355	10	22	7,0	70	185	271	12	17	0	9,3	2	210	11	18,6
125	153	.0125.153.0	560	26	355	10	22	7,0	70	185	391	9,7	8	0	9,3	2	210	11	18,6
125	200	.0125.200.0	670	28	355	10	22	7,0	70	185	501	8,2	4,9	0	9,3	2	210	11	18,6
150	51	.0150.051.0	345	30	390	10	24	9,0	80	266	161	26	79	0	18	2	248	18	36
150	102	.0150.102.0	475	33	390	10	24	9,0	80	266	291	20	24	0	18	2	248	18	36
150	151	.0150.151.0	595	35	390	10	24	9,0	80	266	411	16	12	0	18	2	248	18	36
150	202	.0150.202.0	715	36	390	10	24	9,0	80	266	515	14	7,7	0	18	2	248	18	36

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 10 ...

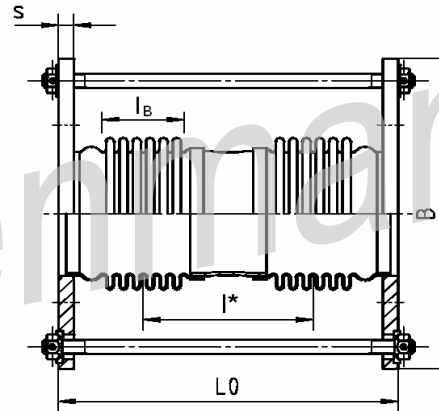


PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LFR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	52	.0200.052.0	370	42	470	10	24	11,9	68	439	199	53	96	0	45	2	275	34	90
200	100	.0200.100.0	520	45	470	10	24	11,9	68	439	349	40	31	0	45	2	275	34	90
200	153	.0200.153.0	680	51	470	10	24	11,9	68	439	509	31	15	0	45	2	275	34	90
200	206	.0200.206.0	860	58	470	10	24	11,9	68	439	668	25	8,5	0	45	2	275	34	90
250	52	.0250.052.0	400	59	560	10	26	16,3	76	674	207	107	115	0	80	2	235	44	160
250	101	.0250.101.0	560	65	560	10	26	16,3	76	674	367	81	37	0	80	2	235	44	160
250	152	.0250.152.0	720	73	560	10	26	16,3	76	674	506	65	19	0	80	2	235	44	160
250	198	.0250.198.0	885	83	560	10	26	16,3	76	674	676	54	11	0	80	2	235	44	160
300	51	.0300.051.0	400	83	630	10	28	20,7	88	940	199	188	213	0	160	2	287	75	320
300	102	.0300.102.0	560	92	630	10	28	20,7	88	940	359	142	66	0	160	2	287	75	320
300	145	.0300.145.0	710	98	630	10	28	20,7	88	940	488	115	36	0	160	2	287	75	320
300	196	.0300.196.0	860	111	630	10	28	20,7	88	940	638	96	21	0	160	2	287	75	320
300	292	.0300.292.0	1160	135	630	10	28	20,7	88	940	938	73	9,7	0	160	2	287	75	320

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 10 ...



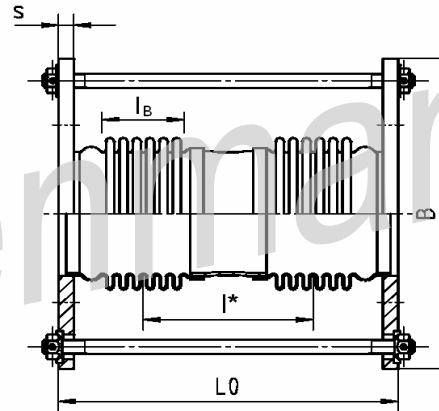
**PN 10**

Nominal diameter	Nominal lateral movement absorption	Type  LFR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	50	.0350.050.0	415	98	690	10	28	26,9	92	1119	213	215	258	0	214	2	330	103	428
350	100	.0350.100.0	585	110	690	10	28	26,9	92	1119	383	160	80	0	214	2	330	103	428
350	149	.0350.149.0	770	112	690	10	28	26,9	92	1119	542	127	39	0	214	2	330	103	428
350	195	.0350.195.0	920	122	690	10	28	26,9	92	1119	692	110	24	0	214	2	330	103	428
350	296	.0350.296.0	1270	147	690	10	28	26,9	92	1119	1042	81	11	0	214	2	330	103	428
400	51	.0400.051.0	510	170	790	10	37	44,0	120	1466	251	266	426	0	282	2	584	238	564
400	106	.0400.106.0	750	165	790	10	37	44,0	120	1466	470	193	120	0	282	2	584	238	564
400	146	.0400.146.0	900	178	790	10	37	44,0	120	1466	620	163	70	0	282	2	584	238	564
400	200	.0400.200.0	1100	195	790	10	37	44,0	120	1466	820	137	40	0	282	2	584	238	564
400	287	.0400.287.0	1450	224	790	10	37	44,0	120	1466	1170	108	20	0	282	2	584	238	564



## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 10 ...

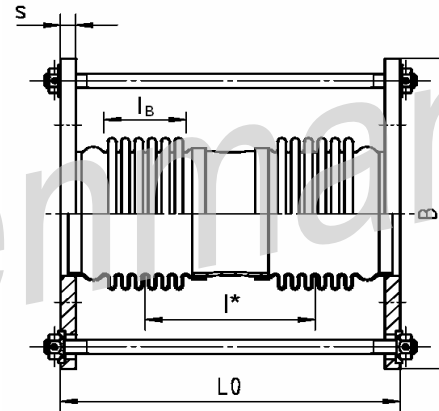


**PN 10**

Nominal diameter	Nominal lateral movement absorption	Type  LFR 10 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	51	.0450.051.0	500	199	760	10	32	50,6	125	1844	246	307	541	0	385	4	564	289	770
450	98	.0450.098.0	700	198	760	10	32	50,6	125	1844	425	225	178	0	385	4	564	289	770
450	153	.0450.153.0	900	223	760	10	32	50,6	125	1844	625	181	83	0	385	4	564	289	770
450	195	.0450.195.0	1050	242	760	10	32	50,6	125	1844	775	159	54	0	385	4	564	289	770
450	285	.0450.285.0	1400	286	760	10	32	50,6	125	1844	1125	121	26	0	385	4	564	289	770
500	51	.0500.051.0	505	228	810	10	34	59,0	135	2273	236	367	639	0	492	4	500	316	984
500	105	.0500.105.0	730	225	810	10	34	59,0	135	2273	435	271	184	0	492	4	500	316	984
500	148	.0500.148.0	880	246	810	10	34	59,0	135	2273	585	227	103	0	492	4	500	316	984
500	207	.0500.207.0	1080	273	810	10	34	59,0	135	2273	785	189	58	0	492	4	500	316	984
500	306	.0500.306.0	1480	327	810	10	34	59,0	135	2273	1185	142	25	0	492	4	500	316	984

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 16 ...

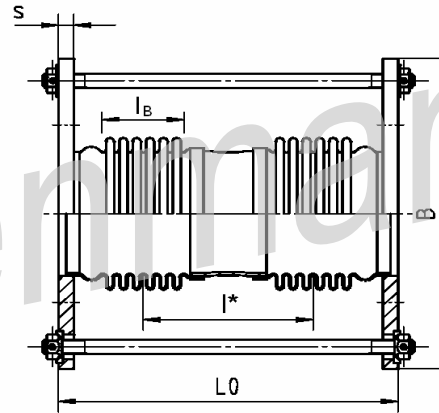


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LFR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	50	.0050.050.0	290	11	270	16	19	3,5	50	46,6	151	4,4	20	0	1,4	2	321	4,2	2,8
50	103	.0050.103.0	420	12	270	16	19	3,5	50	46,6	281	3,2	5,8	0	1,4	2	321	4,2	2,8
50	149	.0050.149.0	535	12	270	16	19	3,5	50	46,6	400	2,5	2,9	0	1,4	2	321	4,2	2,8
50	199	.0050.199.0	685	14	270	16	19	3,5	50	46,6	550	2	1,5	0	1,4	2	321	4,2	2,8
65	53	.0065.053.0	300	12	290	16	20	4,2	55	70,1	156	6,4	24	0	2,5	2	272	5,3	5
65	104	.0065.104.0	420	15	290	16	20	4,2	55	70,1	276	4,8	7,8	0	2,5	2	272	5,3	5
65	145	.0065.145.0	530	15	290	16	20	4,2	55	70,1	386	3,9	4	0	2,5	2	272	5,3	5
65	198	.0065.198.0	690	18	290	16	20	4,2	55	70,1	546	3	2	0	2,5	2	272	5,3	5
80	51	.0080.051.0	310	16	305	16	20	4,7	60	90,8	161	8,1	36	0	4,3	2	329	8,3	8,6
80	102	.0080.102.0	440	18	305	16	20	4,7	60	90,8	291	5,9	11	0	4,3	2	329	8,3	8,6
80	150	.0080.150.0	560	19	305	16	20	4,7	60	90,8	411	4,8	5,5	0	4,3	2	329	8,3	8,6
80	205	.0080.205.0	730	19	305	16	20	4,7	60	90,8	580	3,7	2,8	0	4,3	2	329	8,3	8,6

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 16 ...

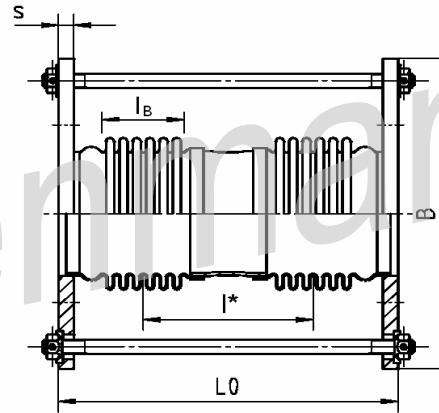


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LFR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	315	18	325	16	22	5,7	52	139	173	12	41	0	8	2	283	11	16
100	103	.0100.103.0	465	20	325	16	22	5,7	52	139	323	8,5	12	0	8	2	283	11	16
100	145	.0100.145.0	595	21	325	16	22	5,7	52	139	453	6,8	6	0	8	2	283	11	16
100	202	.0100.202.0	795	24	325	16	22	5,7	52	139	652	5,2	2,9	0	8	2	283	11	16
125	53	.0125.053.0	350	28	355	16	22	6,8	80	187	171	18	72	0	14	2	360	19	28
125	102	.0125.102.0	480	30	355	16	22	6,8	80	187	301	14	23	0	14	2	360	19	28
125	151	.0125.151.0	600	33	355	16	22	6,8	80	187	421	11	12	0	14	2	360	19	28
125	196	.0125.196.0	720	29	355	16	22	6,8	80	187	525	9,5	7,6	0	14	2	360	19	28
150	53	.0150.053.0	365	37	415	16	24	9,6	80	267	181	33	89	0	25	2	352	26	50
150	100	.0150.100.0	495	40	415	16	24	9,6	80	267	311	25	30	0	25	2	352	26	50
150	153	.0150.153.0	635	45	415	16	24	9,6	80	267	451	20	14	0	25	2	352	26	50
150	194	.0150.194.0	765	42	415	16	24	9,6	80	267	565	17	9,2	0	25	2	352	26	50

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 16 ...

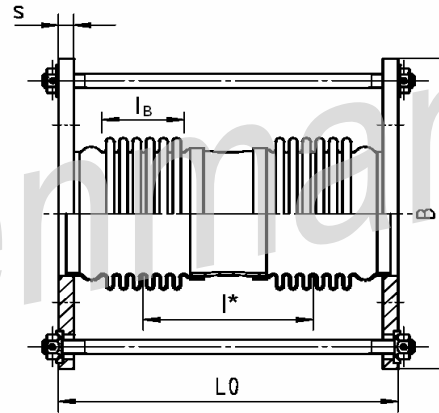


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LFR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	50	.0200.050.0	370	53	505	16	26	13,9	72	441	193	75	143	0	60	2	386	47	120
200	100	.0200.100.0	530	59	505	16	26	13,9	72	441	353	55	43	0	60	2	386	47	120
200	150	.0200.150.0	680	65	505	16	26	13,9	72	441	503	45	21	0	60	2	386	47	120
200	200	.0200.200.0	870	70	505	16	26	13,9	72	441	672	36	12	0	60	2	386	47	120
250	52	.0250.052.0	460	88	590	16	32	22,6	95	677	246	117	226	0	89	2	644	121	178
250	103	.0250.103.0	680	93	590	16	32	22,6	95	677	445	87	68	0	89	2	644	121	178
250	154	.0250.154.0	880	106	590	16	32	22,6	95	677	645	69	33	0	89	2	644	121	178
250	207	.0250.207.0	1130	122	590	16	32	22,6	95	677	895	55	17	0	89	2	644	121	178
300	50	.0300.050.0	495	112	685	16	37	32,8	105	940	235	176	281	0	135	2	564	147	270
300	95	.0300.095.0	665	127	685	16	37	32,8	105	940	405	136	99	0	135	2	564	147	270
300	145	.0300.145.0	865	145	685	16	37	32,8	105	940	605	109	45	0	135	2	564	147	270
300	196	.0300.196.0	1115	166	685	16	37	32,8	105	940	855	88	23	0	135	2	564	147	270
300	296	.0300.296.0	1615	210	685	16	37	32,8	105	940	1355	63	9,1	0	135	2	564	147	270

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 16 ...

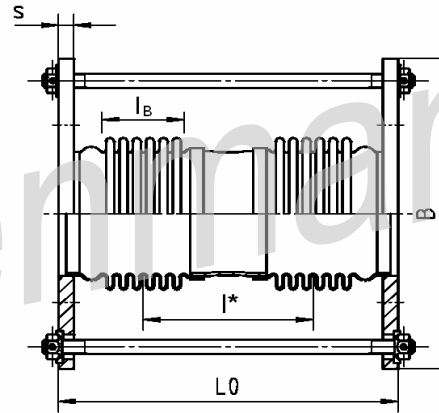


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LFR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	51	.0350.051.0	515	153	670	16	32	45,1	110	1131	260	182	328	0	207	4	665	209	414
350	100	.0350.100.0	715	174	670	16	32	45,1	110	1131	460	138	109	0	207	4	665	209	414
350	149	.0350.149.0	915	196	670	16	32	45,1	110	1131	660	111	54	0	207	4	665	209	414
350	199	.0350.199.0	1165	222	670	16	32	45,1	110	1131	910	88	28	0	207	4	665	209	414
350	306	.0350.306.0	1715	279	670	16	32	45,1	110	1131	1460	62	11	0	207	4	665	209	414
400	52	.0400.052.0	545	185	725	16	34	53,0	130	1476	260	224	481	0	366	4	757	310	732
400	94	.0400.094.0	715	204	725	16	34	53,0	130	1476	430	180	185	0	366	4	757	310	732
400	147	.0400.147.0	915	228	725	16	34	53,0	130	1476	630	145	87	0	366	4	757	310	732
400	200	.0400.200.0	1115	251	725	16	34	53,0	130	1476	830	121	51	0	366	4	757	310	732
400	309	.0400.309.0	1615	309	725	16	34	53,0	130	1476	1330	86	20	0	366	4	757	310	732

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 16 ...

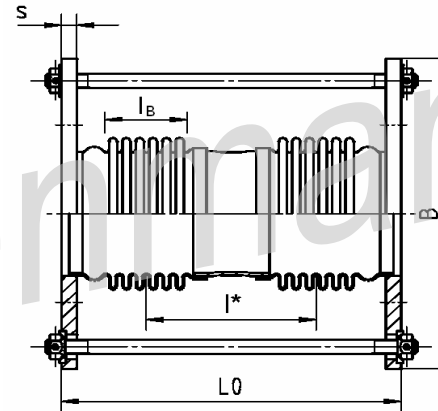


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LFR 16 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L0	G	B	PN	s	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	50	.0450.050.0	550	247	820	16	37	72,8	130	1851	260	316	612	0	510	4	763	392	1020
450	104	.0450.104.0	770	277	820	16	37	72,8	130	1851	480	239	189	0	510	4	763	392	1020
450	155	.0450.155.0	970	305	820	16	37	72,8	130	1851	680	195	95	0	510	4	763	392	1020
450	203	.0450.203.0	1170	332	820	16	37	72,8	130	1851	880	165	57	0	510	4	763	392	1020
450	296	.0450.296.0	1620	395	820	16	37	72,8	130	1851	1330	122	25	0	510	4	763	392	1020

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 25 ...

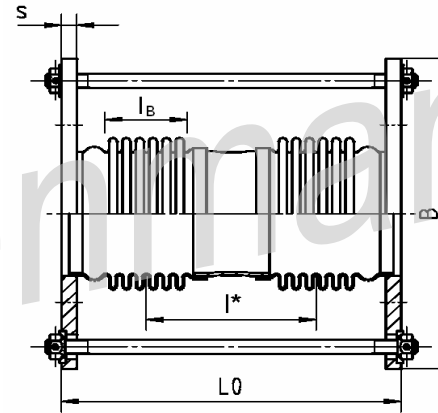


PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LFR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	50	.0050.050.0	300	11	270	40	20	3,6	55	47,2	156	4,3	24	0	1,7	2	398	5,2	3,4
50	98	.0050.098.0	430	13	270	40	20	3,6	55	47,2	286	3,1	7,1	0	1,7	2	398	5,2	3,4
50	148	.0050.148.0	600	13	270	40	20	3,6	55	47,2	455	2,3	2,8	0	1,7	2	398	5,2	3,4
50	205	.0050.205.0	800	15	270	40	20	3,6	55	47,2	655	1,8	1,3	0	1,7	2	398	5,2	3,4
65	51	.0065.051.0	320	16	290	40	22	4,7	44	70,9	185	6,1	26	0	3,7	2	407	8	7,4
65	99	.0065.099.0	470	16	290	40	22	4,7	44	70,9	335	4,4	8	0	3,7	2	407	8	7,4
65	153	.0065.153.0	670	19	290	40	22	4,7	44	70,9	535	3,2	3,1	0	3,7	2	407	8	7,4
65	195	.0065.195.0	830	19	290	40	22	4,7	44	70,9	694	2,6	1,9	0	3,7	2	407	8	7,4
80	52	.0080.052.0	335	20	305	40	24	5,6	65	92,5	176	7,8	41	0	5,5	2	445	11	11
80	103	.0080.103.0	475	19	305	40	24	5,6	65	92,5	315	5,7	13	0	5,5	2	445	11	11
80	155	.0080.155.0	645	21	305	40	24	5,6	65	92,5	485	4,3	5,4	0	5,5	2	445	11	11
80	193	.0080.193.0	785	22	305	40	24	5,6	65	92,5	625	3,6	3,2	0	5,5	2	445	11	11

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 25 ...



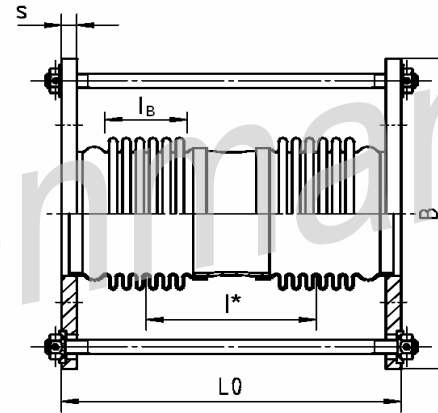
PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LFR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	345	26	340	40	24	7,1	56	141	197	13	56	0	13	2	490	19	26
100	102	.0100.102.0	515	25	340	40	24	7,1	56	141	366	9,6	16	0	13	2	490	19	26
100	144	.0100.144.0	675	27	340	40	24	7,1	56	141	526	7,5	7,7	0	13	2	490	19	26
100	192	.0100.192.0	860	31	340	40	24	7,1	56	141	711	6,1	4,2	0	13	2	490	19	26
125	51	.0125.051.0	365	35	400	40	26	10,5	64	187	195	23	69	0	18	2	450	23	36
125	102	.0125.102.0	525	40	400	40	26	10,5	64	187	355	17	21	0	18	2	450	23	36
125	153	.0125.153.0	715	39	400	40	26	10,5	64	187	529	13	9,3	0	18	2	450	23	36
125	196	.0125.196.0	900	43	400	40	26	10,5	64	187	714	10	5,1	0	18	2	450	23	36
150	51	.0150.051.0	370	49	465	40	28	13,8	64	267	205	45	88	0	31	2	440	33	62
150	102	.0150.102.0	540	53	465	40	28	13,8	64	267	375	33	26	0	31	2	440	33	62
150	151	.0150.151.0	740	55	465	40	28	13,8	64	267	559	25	12	0	31	2	440	33	62
150	194	.0150.194.0	945	61	465	40	28	13,8	64	267	764	20	6,3	0	31	2	440	33	62



## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 25 ...

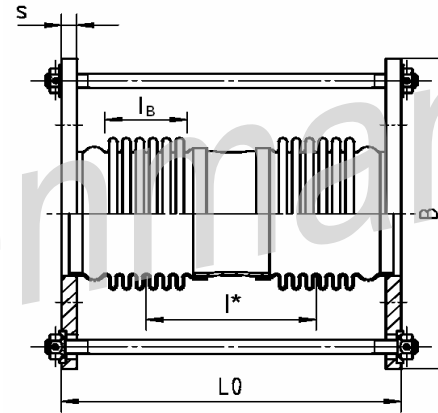


PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LFR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	50	.0200.050.0	440	82	545	25	32	20,7	90	445	241	79	198	0	59	2	828	102	118
200	101	.0200.101.0	640	81	545	25	32	20,7	90	445	420	59	64	0	59	2	828	102	118
200	155	.0200.155.0	910	95	545	25	32	20,7	90	445	690	44	24	0	59	2	828	102	118
200	195	.0200.195.0	1110	105	545	25	32	20,7	90	445	890	36	14	0	59	2	828	102	118
250	51	.0250.051.0	475	145	580	25	35	40,1	100	679	251	117	264	0	106	4	779	147	212
250	101	.0250.101.0	695	149	580	25	35	40,1	100	679	450	85	81	0	106	4	779	147	212
250	149	.0250.149.0	945	170	580	25	35	40,1	100	679	700	64	34	0	106	4	779	147	212
250	204	.0250.204.0	1245	194	580	25	35	40,1	100	679	1000	50	17	0	106	4	779	147	212
300	61	.0300.061.0	610	172	635	25	38	48,6	115	946	340	131	243	0	215	4	982	258	430
300	110	.0300.110.0	835	194	635	25	38	48,6	115	946	565	101	90	0	215	4	982	258	430
300	150	.0300.150.0	1035	214	635	25	38	48,6	115	946	765	83	49	0	215	4	982	258	430
300	200	.0300.200.0	1335	243	635	25	38	48,6	115	946	1065	66	26	0	215	4	982	258	430
300	302	.0300.302.0	1935	302	635	25	38	48,6	115	946	1665	46	10	0	215	4	982	258	430

## Lateral expansion joints with plain fixed flanges

For movement in all planes Type LFR 25 ...

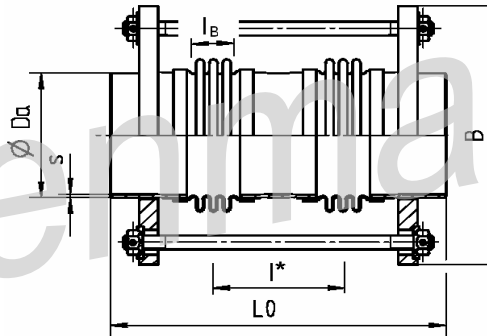


PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LFR 25 ...	Overall length	Weight approx.	Max. width approx.	Flange			Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						drilling acc. to EN 1092	thick-ness	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	PN	s	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	-	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	50	.0350.050.0	545	241	740	25	42	76,4	120	1140	260	194	426	0	267	4	867	275	534
350	100	.0350.100.0	755	265	740	25	42	76,4	120	1140	470	150	137	0	267	4	867	275	534
350	145	.0350.145.0	955	289	740	25	42	76,4	120	1140	670	122	68	0	267	4	867	275	534
350	190	.0350.190.0	1205	318	740	25	42	76,4	120	1140	920	99	36	0	267	4	867	275	534
350	291	.0350.291.0	1755	382	740	25	42	76,4	120	1140	1470	70	14	0	267	4	867	275	534

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 06 ...

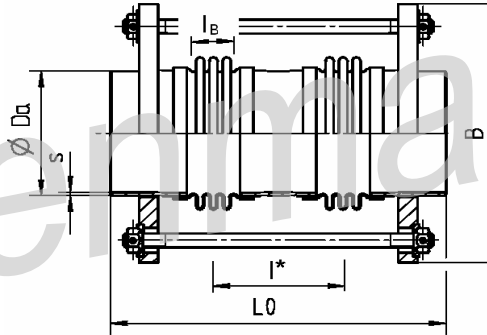


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRR 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	51	.0050.051.0	360	5	210	60,3	4	90	0,5	45	46	136	4,2	14	0	0,9	2	175	2,2	1,8
50	102	.0050.102.0	470	5	210	60,3	4	90	0,5	45	46	246	3,2	4,2	0	0,9	2	175	2,2	1,8
50	154	.0050.154.0	580	6	210	60,3	4	90	0,5	45	46	356	2,6	2	0	0,9	2	175	2,2	1,8
50	196	.0050.196.0	670	8	210	60,3	4	90	0,5	45	46	445	2,2	1,3	0	0,9	2	175	2,2	1,8
65	53	.0065.053.0	370	6	230	76,1	4	90	0,6	50	69,4	141	6,2	17	0	1,5	2	151	2,9	3
65	104	.0065.104.0	480	6	230	76,1	4	90	0,6	50	69,4	251	4,7	5,2	0	1,5	2	151	2,9	3
65	151	.0065.151.0	580	7	230	76,1	4	90	0,6	50	69,4	351	3,9	2,7	0	1,5	2	151	2,9	3
65	204	.0065.204.0	690	8	230	76,1	4	90	0,6	50	69,4	461	3,3	1,6	0	1,5	2	151	2,9	3
80	53	.0080.053.0	380	6	245	88,9	4	90	0,7	55	89,1	146	7,7	20	0	2,2	2	154	3,8	4,4
80	102	.0080.102.0	490	7	245	88,9	4	90	0,7	55	89,1	256	5,9	6,6	0	2,2	2	154	3,8	4,4
80	154	.0080.154.0	600	8	245	88,9	4	90	0,7	55	89,1	366	4,8	3,2	0	2,2	2	154	3,8	4,4
80	201	.0080.201.0	700	8	245	88,9	4	90	0,7	55	89,1	466	4,1	2	0	2,2	2	154	3,8	4,4

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 06 ...

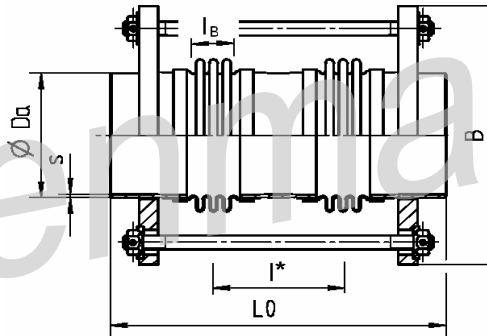


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRR 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	52	.0100.052.0	380	8	270	114,3	4	90	1,0	60	138	141	12	28	0	3,9	2	129	4,9	7,8
100	103	.0100.103.0	490	9	270	114,3	4	90	1,0	60	138	251	9,2	9	0	3,9	2	129	4,9	7,8
100	151	.0100.151.0	590	9	270	114,3	4	90	1,0	60	138	351	7,6	4,6	0	3,9	2	129	4,9	7,8
100	204	.0100.204.0	700	10	270	114,3	4	90	1,0	60	138	461	6,4	2,6	0	3,9	2	129	4,9	7,8
125	51	.0125.051.0	420	9	295	139,7	4	90	1,2	56	184	167	14	31	0	6,9	2	148	7,6	13,8
125	103	.0125.103.0	560	10	295	139,7	4	90	1,2	56	184	307	11	9,1	0	6,9	2	148	7,6	13,8
125	153	.0125.153.0	690	11	295	139,7	4	90	1,2	56	184	437	8,7	4,5	0	6,9	2	148	7,6	13,8
125	203	.0125.203.0	820	12	295	139,7	4	90	1,2	56	184	567	7,3	2,7	0	6,9	2	148	7,6	13,8
150	53	.0150.053.0	455	15	325	168,3	4,5	100	1,8	75	264	166	19	63	0	16	2	205	15	32
150	101	.0150.101.0	575	16	325	168,3	4,5	100	1,8	75	264	286	15	21	0	16	2	205	15	32
150	151	.0150.151.0	695	17	325	168,3	4,5	100	1,8	75	264	406	12	10	0	16	2	205	15	32
150	202	.0150.202.0	815	19	325	168,3	4,5	100	1,8	75	264	526	11	6,2	0	16	2	205	15	32

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 06 ...

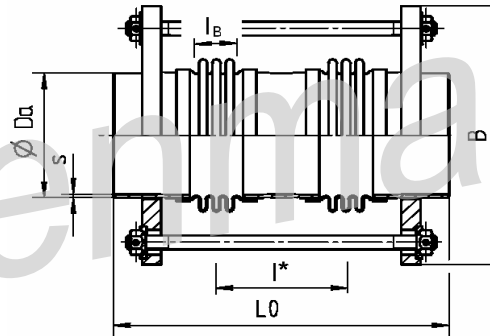


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRR 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	51	.0200.051.0	490	23	380	219,1	6,3	110	3,6	85	436	166	37	97	0	31	2	194	23	62
200	100	.0200.100.0	620	25	380	219,1	6,3	110	3,6	85	436	296	29	30	0	31	2	194	23	62
200	153	.0200.153.0	750	27	380	219,1	6,3	110	3,6	85	436	426	24	15	0	31	2	194	23	62
200	198	.0200.198.0	880	40	380	219,1	6,3	110	3,6	85	436	535	20	9,2	0	31	2	194	23	62
250	50	.0250.050.0	520	37	465	273	7,1	120	5,6	90	670	171	72	122	0	55	2	169	31	110
250	102	.0250.102.0	660	40	465	273	7,1	120	5,6	90	670	311	57	37	0	55	2	169	31	110
250	153	.0250.153.0	790	42	465	273	7,1	120	5,6	90	670	441	47	18	0	55	2	169	31	110
250	212	.0250.212.0	960	64	465	273	7,1	120	5,6	90	670	590	38	10	0	55	2	169	31	110
300	50	.0300.050.0	535	50	555	323,9	8	120	7,4	80	932	191	137	148	0	104	2	183	47	208
300	101	.0300.101.0	695	54	555	323,9	8	120	7,4	80	932	351	105	44	0	104	2	183	47	208
300	152	.0300.152.0	845	58	555	323,9	8	120	7,4	80	932	501	87	22	0	104	2	183	47	208
300	196	.0300.196.0	1000	90	555	323,9	8	120	7,4	80	932	630	73	13	0	104	2	183	47	208
300	296	.0300.296.0	1300	113	555	323,9	8	120	7,4	80	932	930	56	6,2	0	104	2	183	47	208

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 06 ...

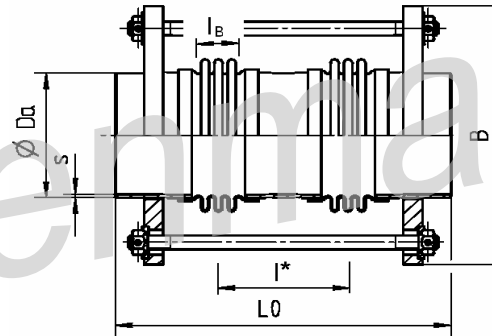


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRR 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	52	.0350.052.0	585	52	590	355,6	6	130	6,7	84	1110	215	157	159	0	139	2	212	65	278
350	102	.0350.102.0	755	57	590	355,6	6	130	6,7	84	1110	385	120	50	0	139	2	212	65	278
350	148	.0350.148.0	925	79	590	355,6	6	130	6,7	84	1110	534	96	26	0	139	2	212	65	278
350	195	.0350.195.0	1075	88	590	355,6	6	130	6,7	84	1110	684	82	16	0	139	2	212	65	278
350	300	.0350.300.0	1425	111	590	355,6	6	130	6,7	84	1110	1034	62	6,9	0	139	2	212	65	278
400	51	.0400.051.0	645	77	665	406,4	6	140	8,2	110	1456	231	235	249	0	143	2	289	117	286
400	100	.0400.100.0	850	96	665	406,4	6	140	8,2	110	1456	410	178	77	0	143	2	289	117	286
400	158	.0400.158.0	1050	112	665	406,4	6	140	8,2	110	1456	610	143	35	0	143	2	289	117	286
400	200	.0400.200.0	1200	124	665	406,4	6	140	8,2	110	1456	760	123	23	0	143	2	289	117	286
400	294	.0400.294.0	1600	155	665	406,4	6	140	8,2	110	1456	1160	92	9,8	0	143	2	289	117	286

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 06 ...

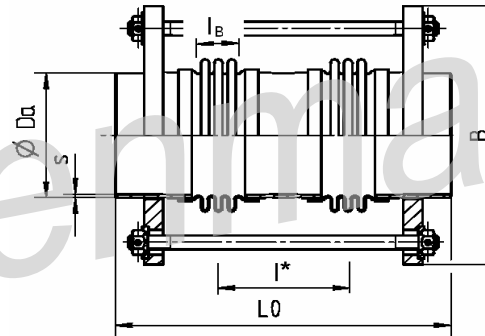


PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRR 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	50	.0450.050.0	655	85	725	457	6	140	9,3	115	1828	236	286	304	0	198	2	293	149	396
450	97	.0450.097.0	860	107	725	457	6	140	9,3	115	1828	415	218	95	0	198	2	293	149	396
450	152	.0450.152.0	1060	124	725	457	6	140	9,3	115	1828	615	176	44	0	198	2	293	149	396
450	192	.0450.192.0	1210	137	725	457	6	140	9,3	115	1828	765	155	29	0	198	2	293	149	396
450	289	.0450.289.0	1570	172	725	457	6	140	9,3	120	1832	1120	119	18	0	262	2	391	199	524
500	52	.0500.052.0	750	130	820	508	6	180	13,3	125	2265	236	375	424	0	332	2	331	208	664
500	104	.0500.104.0	965	155	820	508	6	180	13,3	125	2265	425	286	128	0	332	2	331	208	664
500	147	.0500.147.0	1115	170	820	508	6	180	13,3	125	2265	575	248	71	0	332	2	331	208	664
500	207	.0500.207.0	1315	190	820	508	6	180	13,3	125	2265	775	209	39	0	332	2	331	208	664
500	289	.0500.289.0	1615	220	820	508	6	180	13,3	125	2265	1075	168	20	0	332	2	331	208	664

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 10 ...



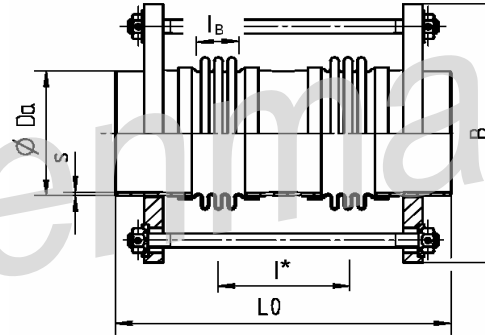
PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRR 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	51	.0050.051.0	360	5	210	60,3	4	90	0,5	45	46	136	4,2	14	0	0,9	2	175	2,2	1,8
50	102	.0050.102.0	470	5	210	60,3	4	90	0,5	45	46	246	3,2	4,2	0	0,9	2	175	2,2	1,8
50	149	.0050.149.0	580	6	210	60,3	4	90	0,5	45	46	356	2,6	2	0	0,9	2	175	2,2	1,8
50	202	.0050.202.0	720	9	210	60,3	4	90	0,5	45	46	495	2,1	1	0	0,9	2	175	2,2	1,8
65	53	.0065.053.0	370	6	230	76,1	4	90	0,6	50	69,4	141	6,2	17	0	1,5	2	151	2,9	3
65	104	.0065.104.0	480	6	230	76,1	4	90	0,6	50	69,4	251	4,7	5,2	0	1,5	2	151	2,9	3
65	146	.0065.146.0	580	7	230	76,1	4	90	0,6	50	69,4	351	3,9	2,7	0	1,5	2	151	2,9	3
65	201	.0065.201.0	730	8	230	76,1	4	90	0,6	50	69,4	501	3,1	1,3	0	1,5	2	151	2,9	3
80	53	.0080.053.0	400	7	245	88,9	4	90	0,7	60	89,9	161	7,4	30	0	3,6	2	278	6,9	7,2
80	101	.0080.101.0	520	8	245	88,9	4	90	0,7	60	89,9	281	5,6	9,9	0	3,6	2	278	6,9	7,2
80	151	.0080.151.0	640	9	245	88,9	4	90	0,7	60	89,9	401	4,6	4,9	0	3,6	2	278	6,9	7,2
80	202	.0080.202.0	760	10	245	88,9	4	90	0,7	60	89,9	521	3,8	2,9	0	3,6	2	278	6,9	7,2



## Lateral expansion joints with weld ends

For movement in all planes Type LRR 10 ...

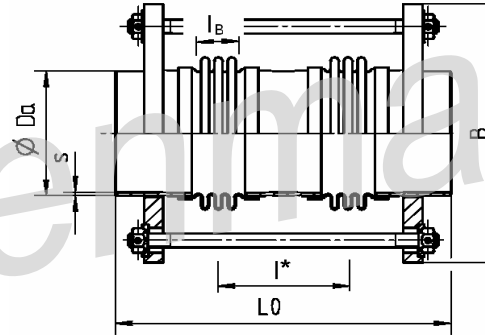


PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRR 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	410	9	270	114,3	4	100	1,1	48	138	159	11	27	0	4,9	2	161	6,2	9,8
100	100	.0100.100.0	540	10	270	114,3	4	100	1,1	48	138	289	8,5	8,3	0	4,9	2	161	6,2	9,8
100	146	.0100.146.0	670	11	270	114,3	4	100	1,1	48	138	419	6,8	3,9	0	4,9	2	161	6,2	9,8
100	203	.0100.203.0	850	12	270	114,3	4	100	1,1	48	138	599	5,3	1,9	0	4,9	2	161	6,2	9,8
125	50	.0125.050.0	435	12	295	139,7	4	100	1,3	70	185	151	14	54	0	9,3	2	210	11	18,6
125	100	.0125.100.0	555	13	295	139,7	4	100	1,3	70	185	271	11	17	0	9,3	2	210	11	18,6
125	153	.0125.153.0	675	14	295	139,7	4	100	1,3	70	185	391	9	8,1	0	9,3	2	210	11	18,6
125	200	.0125.200.0	785	15	295	139,7	4	100	1,3	70	185	501	7,7	4,9	0	9,3	2	210	11	18,6
150	51	.0150.051.0	475	17	325	168,3	4,5	110	2,0	80	266	161	23	81	0	18	2	248	18	36
150	102	.0150.102.0	605	19	325	168,3	4,5	110	2,0	80	266	291	18	25	0	18	2	248	18	36
150	151	.0150.151.0	725	21	325	168,3	4,5	110	2,0	80	266	411	15	12	0	18	2	248	18	36
150	202	.0150.202.0	845	22	325	168,3	4,5	110	2,0	80	266	531	13	7,4	0	18	2	248	18	36

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 10 ...

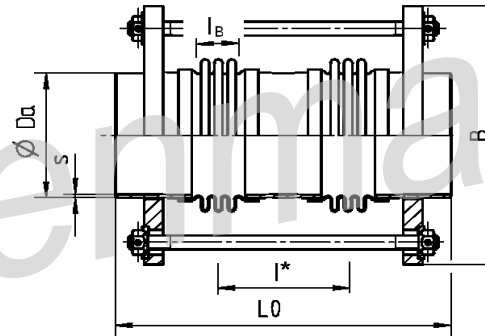


PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRR 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	52	.0200.052.0	530	30	405	219,1	6,3	120	3,9	68	439	199	47	95	0	45	2	275	34	90
200	100	.0200.100.0	680	32	405	219,1	6,3	120	3,9	68	439	349	36	31	0	45	2	275	34	90
200	153	.0200.153.0	840	35	405	219,1	6,3	120	3,9	68	439	509	29	15	0	45	2	275	34	90
200	206	.0200.206.0	1015	53	405	219,1	6,3	120	3,9	68	439	668	24	8,5	0	45	2	275	34	90
250	52	.0250.052.0	565	48	500	273	7,1	130	6,0	76	674	207	97	116	0	80	2	235	44	160
250	101	.0250.101.0	725	52	500	273	7,1	130	6,0	76	674	367	75	37	0	80	2	235	44	160
250	152	.0250.152.0	885	56	500	273	7,1	130	6,0	76	674	527	61	18	0	80	2	235	44	160
250	198	.0250.198.0	1055	81	500	273	7,1	130	6,0	76	674	676	51	11	0	80	2	235	44	160
300	51	.0300.051.0	590	74	575	323,9	8	140	8,7	88	940	199	162	216	0	160	2	287	75	320
300	102	.0300.102.0	750	80	575	323,9	8	140	8,7	88	940	359	127	66	0	160	2	287	75	320
300	145	.0300.145.0	905	103	575	323,9	8	140	8,7	88	940	488	104	35	0	160	2	287	75	320
300	196	.0300.196.0	1055	116	575	323,9	8	140	8,7	88	940	638	90	21	0	160	2	287	75	320
300	292	.0300.292.0	1355	140	575	323,9	8	140	8,7	88	940	938	70	9,7	0	160	2	287	75	320

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 10 ...

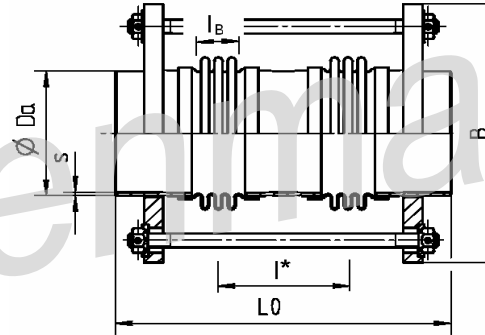


PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRR 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	50	.0350.050.0	610	73	615	355,6	6	140	7,2	92	1119	213	193	256	0	214	2	330	103	428
350	100	.0350.100.0	780	80	615	355,6	6	140	7,2	92	1119	383	147	79	0	214	2	330	103	428
350	149	.0350.149.0	965	100	615	355,6	6	140	7,2	92	1119	542	119	39	0	214	2	330	103	428
350	195	.0350.195.0	1115	111	615	355,6	6	140	7,2	92	1119	692	102	24	0	214	2	330	103	428
350	296	.0350.296.0	1465	135	615	355,6	6	140	7,2	92	1119	1042	78	11	0	214	2	330	103	428
400	51	.0400.051.0	715	116	705	406,4	6	160	9,4	120	1466	251	250	428	0	282	2	584	238	564
400	106	.0400.106.0	960	138	705	406,4	6	160	9,4	120	1466	470	185	119	0	282	2	584	238	564
400	146	.0400.146.0	1110	151	705	406,4	6	160	9,4	120	1466	620	157	69	0	282	2	584	238	564
400	200	.0400.200.0	1310	168	705	406,4	6	160	9,4	120	1466	820	133	40	0	282	2	584	238	564
400	287	.0400.287.0	1660	198	705	406,4	6	160	9,4	120	1466	1170	105	20	0	282	2	584	238	564

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 10 ...

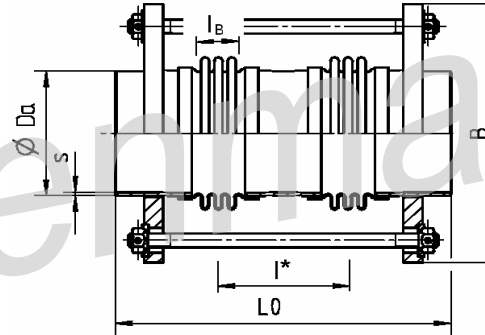


PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRR 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	51	.0450.051.0	715	143	690	457	8	160	14,1	125	1844	246	279	543	0	385	4	564	289	770
450	98	.0450.098.0	920	173	690	457	8	160	14,1	125	1844	425	214	176	0	385	4	564	289	770
450	153	.0450.153.0	1120	198	690	457	8	160	14,1	125	1844	625	174	83	0	385	4	564	289	770
450	195	.0450.195.0	1270	217	690	457	8	160	14,1	125	1844	775	151	54	0	385	4	564	289	770
450	285	.0450.285.0	1620	261	690	457	8	160	14,1	125	1844	1125	118	26	0	385	4	564	289	770
500	51	.0500.051.0	720	161	740	508	8	160	15,7	135	2273	236	334	642	0	492	4	500	316	984
500	105	.0500.105.0	945	195	740	508	8	160	15,7	135	2273	435	247	184	0	492	4	500	316	984
500	148	.0500.148.0	1095	215	740	508	8	160	15,7	135	2273	585	214	103	0	492	4	500	316	984
500	207	.0500.207.0	1295	242	740	508	8	160	15,7	135	2273	785	180	58	0	492	4	500	316	984
500	306	.0500.306.0	1695	297	740	508	8	160	15,7	135	2273	1185	137	25	0	492	4	500	316	984

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 16 ...

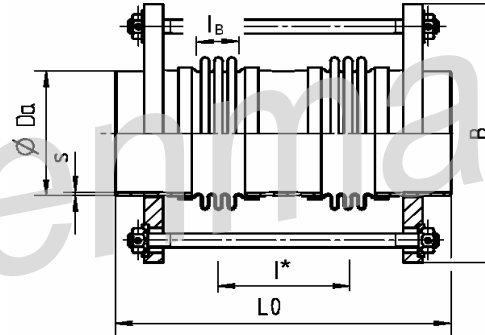


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRR 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	50	.0050.050.0	380	6	210	60,3	4	90	0,5	50	46,6	151	4	20	0	1,4	2	321	4,2	2,8
50	103	.0050.103.0	510	6	210	60,3	4	90	0,5	50	46,6	281	3	5,9	0	1,4	2	321	4,2	2,8
50	149	.0050.149.0	630	7	210	60,3	4	90	0,5	50	46,6	401	2,4	2,9	0	1,4	2	321	4,2	2,8
50	199	.0050.199.0	780	9	210	60,3	4	90	0,5	50	46,6	550	1,9	1,5	0	1,4	2	321	4,2	2,8
65	53	.0065.053.0	410	8	230	76,1	4	100	0,7	55	70,1	156	5,8	25	0	2,5	2	272	5,3	5
65	104	.0065.104.0	530	9	230	76,1	4	100	0,7	55	70,1	276	4,4	7,9	0	2,5	2	272	5,3	5
65	145	.0065.145.0	640	9	230	76,1	4	100	0,7	55	70,1	386	3,6	4	0	2,5	2	272	5,3	5
65	198	.0065.198.0	800	10	230	76,1	4	100	0,7	55	70,1	546	2,9	2	0	2,5	2	272	5,3	5
80	51	.0080.051.0	420	9	245	88,9	4	100	0,8	60	90,8	161	7,3	36	0	4,3	2	329	8,3	8,6
80	102	.0080.102.0	550	10	245	88,9	4	100	0,8	60	90,8	291	5,5	11	0	4,3	2	329	8,3	8,6
80	150	.0080.150.0	670	11	245	88,9	4	100	0,8	60	90,8	411	4,5	5,5	0	4,3	2	329	8,3	8,6
80	205	.0080.205.0	840	13	245	88,9	4	100	0,8	60	90,8	581	3,5	2,8	0	4,3	2	329	8,3	8,6

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 16 ...

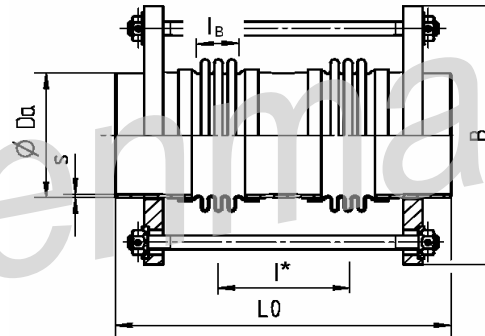


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRR 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	425	10	270	114,3	4	100	1,1	52	139	173	11	41	0	8	2	283	11	16
100	103	.0100.103.0	575	12	270	114,3	4	100	1,1	52	139	323	7,9	12	0	8	2	283	11	16
100	145	.0100.145.0	705	13	270	114,3	4	100	1,1	52	139	453	6,4	6	0	8	2	283	11	16
100	202	.0100.202.0	905	18	270	114,3	4	100	1,1	52	139	652	5	2,9	0	8	2	283	11	16
125	53	.0125.053.0	485	17	295	139,7	4	110	1,5	80	187	171	16	73	0	14	2	360	19	28
125	102	.0125.102.0	615	19	295	139,7	4	110	1,5	80	187	301	12	23	0	14	2	360	19	28
125	151	.0125.151.0	735	21	295	139,7	4	110	1,5	80	187	421	10	12	0	14	2	360	19	28
125	196	.0125.196.0	855	23	295	139,7	4	110	1,5	80	187	541	8,8	7,2	0	14	2	360	19	28
150	53	.0150.053.0	515	24	350	168,3	4,5	120	2,2	80	267	181	29	91	0	25	2	352	26	50
150	100	.0150.100.0	645	26	350	168,3	4,5	120	2,2	80	267	311	23	31	0	25	2	352	26	50
150	153	.0150.153.0	785	29	350	168,3	4,5	120	2,2	80	267	451	19	15	0	25	2	352	26	50
150	194	.0150.194.0	915	35	350	168,3	4,5	120	2,2	80	267	565	16	9,2	0	25	2	352	26	50

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 16 ...

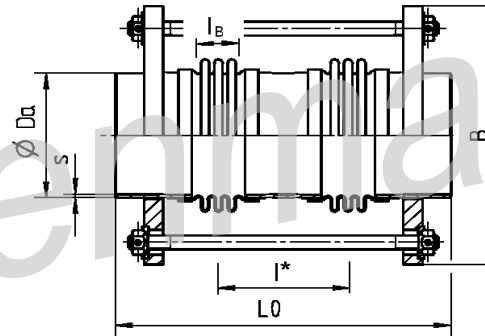


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRR 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	I*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	50	.0200.050.0	545	41	440	219,1	6,3	130	4,3	72	441	193	65	144	0	60	2	386	47	120
200	100	.0200.100.0	705	45	440	219,1	6,3	130	4,3	72	441	353	50	43	0	60	2	386	47	120
200	150	.0200.150.0	855	49	440	219,1	6,3	130	4,3	72	441	503	41	21	0	60	2	386	47	120
200	200	.0200.200.0	1045	65	440	219,1	6,3	130	4,3	72	441	672	34	12	0	60	2	386	47	120
250	52	.0250.052.0	640	67	520	273	7,1	140	6,5	95	677	246	106	227	0	89	2	644	121	178
250	103	.0250.103.0	860	84	520	273	7,1	140	6,5	95	677	445	79	68	0	89	2	644	121	178
250	154	.0250.154.0	1060	97	520	273	7,1	140	6,5	95	677	645	64	33	0	89	2	644	121	178
250	207	.0250.207.0	1310	114	520	273	7,1	140	6,5	95	677	895	52	17	0	89	2	644	121	178
300	50	.0300.050.0	710	109	615	323,9	8	160	9,9	105	940	235	156	281	0	135	2	564	147	270
300	95	.0300.095.0	880	124	615	323,9	8	160	9,9	105	940	405	127	99	0	135	2	564	147	270
300	145	.0300.145.0	1080	141	615	323,9	8	160	9,9	105	940	605	103	45	0	135	2	564	147	270
300	196	.0300.196.0	1330	164	615	323,9	8	160	9,9	105	940	855	83	23	0	135	2	564	147	270
300	296	.0300.296.0	1830	207	615	323,9	8	160	9,9	105	940	1355	60	9,1	0	135	2	564	147	270

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 16 ...



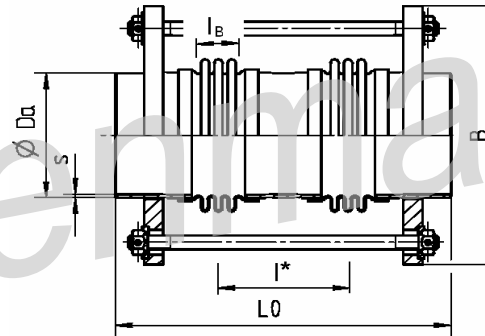
PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRR 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	51	.0350.051.0	740	118	580	355,6	8	160	10,9	110	1131	260	166	328	0	207	4	665	209	414
350	100	.0350.100.0	940	139	580	355,6	8	160	10,9	110	1131	460	129	109	0	207	4	665	209	414
350	149	.0350.149.0	1140	160	580	355,6	8	160	10,9	110	1131	660	105	54	0	207	4	665	209	414
350	199	.0350.199.0	1390	187	580	355,6	8	160	10,9	110	1131	910	84	28	0	207	4	665	209	414
350	306	.0350.306.0	1940	244	580	355,6	8	160	10,9	110	1131	1460	60	11	0	207	4	665	209	414
400	52	.0400.052.0	760	143	635	406,4	8	160	12,5	130	1476	260	211	476	0	366	4	757	310	732
400	94	.0400.094.0	930	163	635	406,4	8	160	12,5	130	1476	430	168	183	0	366	4	757	310	732
400	147	.0400.147.0	1130	186	635	406,4	8	160	12,5	130	1476	630	137	87	0	366	4	757	310	732
400	200	.0400.200.0	1330	209	635	406,4	8	160	12,5	130	1476	830	115	50	0	366	4	757	310	732
400	309	.0400.309.0	1830	266	635	406,4	8	160	12,5	130	1476	1330	83	20	0	366	4	757	310	732



## Lateral expansion joints with weld ends

For movement in all planes Type LRR 16 ...

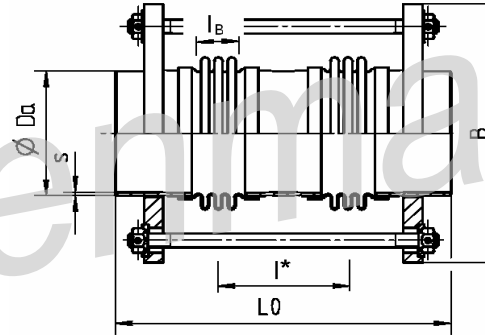


PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRR 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
450	50	.0450.050.0	800	202	725	457	8	180	15,8	130	1851	260	290	603	0	510	4	763	392	1020
450	104	.0450.104.0	1020	232	725	457	8	180	15,8	130	1851	480	224	188	0	510	4	763	392	1020
450	155	.0450.155.0	1220	259	725	457	8	180	15,8	130	1851	680	185	95	0	510	4	763	392	1020
450	203	.0450.203.0	1420	287	725	457	8	180	15,8	130	1851	880	158	57	0	510	4	763	392	1020
450	296	.0450.296.0	1870	350	725	457	8	180	15,8	130	1851	1330	118	25	0	510	4	763	392	1020

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 25 ...

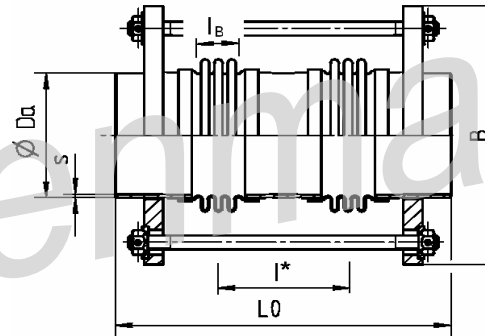


PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRR 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	50	.0050.050.0	410	7	210	60,3	4	100	0,6	55	47,2	156	3,9	24	0	1,7	2	398	5,2	3,4
50	98	.0050.098.0	540	8	210	60,3	4	100	0,6	55	47,2	286	2,9	7,1	0	1,7	2	398	5,2	3,4
50	148	.0050.148.0	710	10	210	60,3	4	100	0,6	55	47,2	455	2,2	2,8	0	1,7	2	398	5,2	3,4
50	205	.0050.205.0	910	12	210	60,3	4	100	0,6	55	47,2	655	1,7	1,4	0	1,7	2	398	5,2	3,4
65	51	.0065.051.0	430	8	230	76,1	4	100	0,7	44	70,9	185	5,5	26	0	3,7	2	407	8	7,4
65	99	.0065.099.0	580	9	230	76,1	4	100	0,7	44	70,9	335	4,1	8	0	3,7	2	407	8	7,4
65	153	.0065.153.0	780	11	230	76,1	4	100	0,7	44	70,9	535	3	3,1	0	3,7	2	407	8	7,4
65	195	.0065.195.0	940	14	230	76,1	4	100	0,7	44	70,9	694	2,5	1,9	0	3,7	2	407	8	7,4
80	52	.0080.052.0	440	11	245	88,9	4	100	0,8	65	92,5	176	6,9	41	0	5,5	2	445	11	11
80	103	.0080.103.0	580	13	245	88,9	4	100	0,8	65	92,5	316	5,2	13	0	5,5	2	445	11	11
80	155	.0080.155.0	750	16	245	88,9	4	100	0,8	65	92,5	485	4	5,4	0	5,5	2	445	11	11
80	193	.0080.193.0	890	17	245	88,9	4	100	0,8	65	92,5	625	3,4	3,3	0	5,5	2	445	11	11

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 25 ...

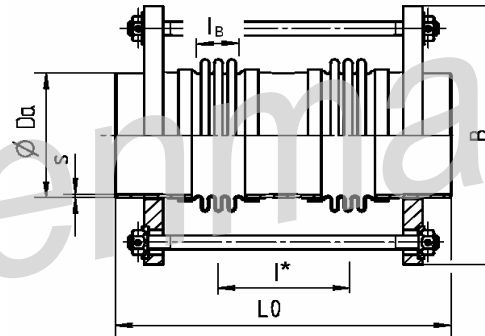


PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRR 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	475	15	270	114,3	4	110	1,2	56	141	197	12	55	0	13	2	490	19	26
100	102	.0100.102.0	645	18	270	114,3	4	110	1,2	56	141	366	9	16	0	13	2	490	19	26
100	144	.0100.144.0	805	21	270	114,3	4	110	1,2	56	141	526	7,1	7,7	0	13	2	490	19	26
100	192	.0100.192.0	990	24	270	114,3	4	110	1,2	56	141	711	5,8	4,2	0	13	2	490	19	26
125	51	.0125.051.0	515	22	320	139,7	4	120	1,6	64	187	195	20	69	0	18	2	450	23	36
125	102	.0125.102.0	675	25	320	139,7	4	120	1,6	64	187	355	15	21	0	18	2	450	23	36
125	153	.0125.153.0	865	28	320	139,7	4	120	1,6	64	187	545	12	8,9	0	18	2	450	23	36
125	196	.0125.196.0	1050	34	320	139,7	4	120	1,6	64	187	714	9,7	5,2	0	18	2	450	23	36
150	51	.0150.051.0	545	31	385	168,3	4,5	130	2,3	64	267	205	39	88	0	31	2	440	33	62
150	102	.0150.102.0	715	35	385	168,3	4,5	130	2,3	64	267	375	30	26	0	31	2	440	33	62
150	151	.0150.151.0	915	40	385	168,3	4,5	130	2,3	64	267	575	23	11	0	31	2	440	33	62
150	194	.0150.194.0	1120	49	385	168,3	4,5	130	2,3	64	267	764	19	6,3	0	31	2	440	33	62

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 25 ...

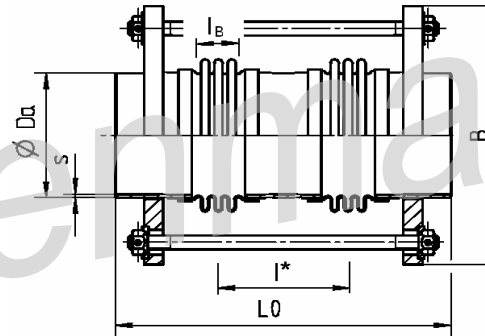


PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRR 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	I*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	50	.0200.050.0	670	65	460	219,1	6,3	160	5,3	90	445	241	70	199	0	59	2	828	102	118
200	101	.0200.101.0	870	77	460	219,1	6,3	160	5,3	90	445	420	53	64	0	59	2	828	102	118
200	155	.0200.155.0	1140	91	460	219,1	6,3	160	5,3	90	445	690	40	24	0	59	2	828	102	118
200	195	.0200.195.0	1340	101	460	219,1	6,3	160	5,3	90	445	890	34	15	0	59	2	828	102	118
250	51	.0250.051.0	650	94	495	273	7,1	140	6,5	100	679	251	106	264	0	106	4	779	147	212
250	101	.0250.101.0	870	115	495	273	7,1	140	6,5	100	679	450	79	81	0	106	4	779	147	212
250	149	.0250.149.0	1120	136	495	273	7,1	140	6,5	100	679	700	61	34	0	106	4	779	147	212
250	204	.0250.204.0	1420	160	495	273	7,1	140	6,5	100	679	1000	48	17	0	106	4	779	147	212
300	61	.0300.061.0	825	147	550	323,9	8	160	9,9	115	946	340	118	241	0	215	4	982	258	430
300	110	.0300.110.0	1050	169	550	323,9	8	160	9,9	115	946	565	93	90	0	215	4	982	258	430
300	150	.0300.150.0	1250	188	550	323,9	8	160	9,9	115	946	765	78	49	0	215	4	982	258	430
300	200	.0300.200.0	1550	218	550	323,9	8	160	9,9	115	946	1065	62	26	0	215	4	982	258	430
300	302	.0300.302.0	2150	277	550	323,9	8	160	9,9	115	946	1665	45	10	0	215	4	982	258	430

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 25 ...

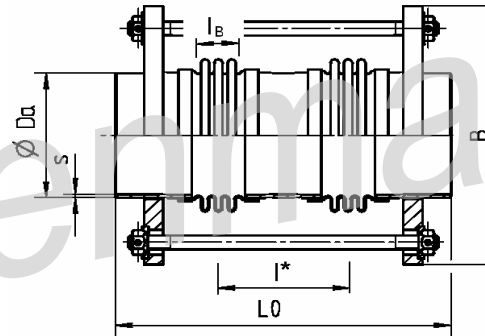


PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRR 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	Da	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
350	50	.0350.050.0	790	158	615	355,6	8	180	12,3	120	1140	260	179	426	0	267	4	867	275	534
350	100	.0350.100.0	1000	182	615	355,6	8	180	12,3	120	1140	470	141	137	0	267	4	867	275	534
350	145	.0350.145.0	1200	205	615	355,6	8	180	12,3	120	1140	670	116	68	0	267	4	867	275	534
350	190	.0350.190.0	1450	235	615	355,6	8	180	12,3	120	1140	920	94	36	0	267	4	867	275	534
350	291	.0350.291.0	2000	299	615	355,6	8	180	12,3	120	1140	1470	68	14	0	267	4	867	275	534

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 40 ...

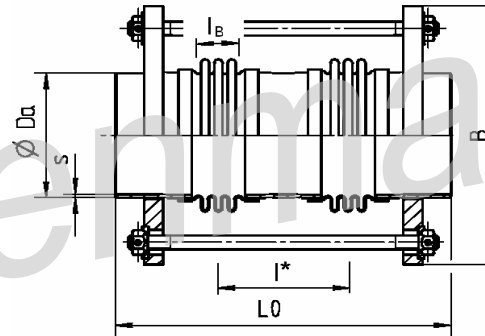


PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRR 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	53	.0050.053.0	440	7	210	60,3	4	100	0,6	44	47,2	194	3,5	19	0	2,1	2	497	6,5	4,2
50	100	.0050.100.0	640	9	210	60,3	4	100	0,6	44	47,2	394	2,4	4,6	0	2,1	2	497	6,5	4,2
50	146	.0050.146.0	840	11	210	60,3	4	100	0,6	44	47,2	594	1,8	2	0	2,1	2	497	6,5	4,2
50	204	.0050.204.0	1090	13	210	60,3	4	100	0,6	44	47,2	844	1,4	1	0	2,1	2	497	6,5	4,2
65	49	.0065.049.0	465	12	230	76,1	4	110	0,8	48	71,6	198	6,2	33	0	4,9	2	601	12	9,8
65	100	.0065.100.0	665	14	230	76,1	4	110	0,8	48	71,6	398	4,3	8,4	0	4,9	2	601	12	9,8
65	156	.0065.156.0	915	17	230	76,1	4	110	0,8	48	71,6	648	3,1	3,2	0	4,9	2	601	12	9,8
65	200	.0065.200.0	1115	20	230	76,1	4	110	0,8	48	71,6	848	2,6	1,8	0	4,9	2	601	12	9,8
80	51	.0080.051.0	475	13	245	88,9	4	110	0,9	52	92,5	202	8	38	0	6,9	2	556	14	13,8
80	101	.0080.101.0	675	16	245	88,9	4	110	0,9	52	92,5	402	5,6	9,8	0	6,9	2	556	14	13,8
80	156	.0080.156.0	925	19	245	88,9	4	110	0,9	52	92,5	652	4,1	3,7	0	6,9	2	556	14	13,8
80	188	.0080.188.0	1075	21	245	88,9	4	110	0,9	52	92,5	802	3,5	2,5	0	6,9	2	556	14	13,8

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 40 ...

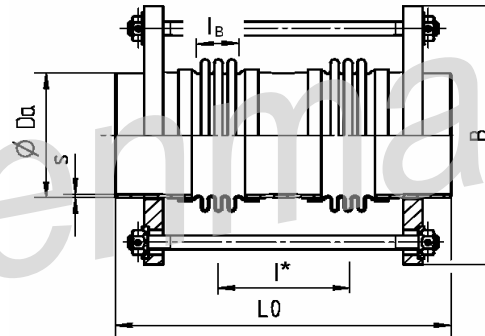


PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRR 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	46	.0100.046.0	590	26	330	114,3	4	130	1,4	65	136	265	19	63	0	9,6	2	1066	40	19,2
100	96	.0100.096.0	830	32	330	114,3	4	130	1,4	84	137	484	13	20	0	9,8	2	1132	43	19,6
100	146	.0100.146.0	1130	39	330	114,3	4	130	1,4	84	137	784	9,6	7,8	0	9,8	2	1132	43	19,6
100	197	.0100.197.0	1430	46	330	114,3	4	130	1,4	84	137	1084	7,6	4,1	0	9,8	2	1132	43	19,6
125	46	.0125.046.0	600	32	355	139,7	4	130	1,7	80	187	230	25	89	0	15	2	835	43	30
125	94	.0125.094.0	850	38	355	139,7	4	130	1,7	80	187	480	17	21	0	15	2	835	43	30
125	152	.0125.152.0	1200	47	355	139,7	4	130	1,7	80	187	830	12	7,1	0	15	2	835	43	30
125	193	.0125.193.0	1450	53	355	139,7	4	130	1,7	80	187	1080	10	4,2	0	15	2	835	43	30
150	55	.0150.055.0	730	53	405	168,3	4,5	160	2,9	64	269	314	38	81	0	32	2	966	72	64
150	96	.0150.096.0	980	61	405	168,3	4,5	160	2,9	64	269	564	28	25	0	32	2	966	72	64
150	149	.0150.149.0	1330	74	405	168,3	4,5	160	2,9	64	269	914	21	9,7	0	32	2	966	72	64
150	195	.0150.195.0	1630	85	405	168,3	4,5	160	2,9	64	269	1214	17	5,5	0	32	2	966	72	64

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 40 ...



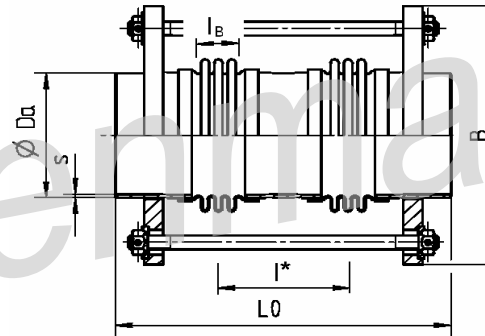
PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRR 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	I*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	54	.0200.054.0	760	102	440	219,1	6,3	160	5,3	100	447	300	60	182	0	79	4	1224	152	158
200	97	.0200.097.0	960	115	440	219,1	6,3	160	5,3	100	447	500	48	67	0	79	4	1224	152	158
200	149	.0200.149.0	1260	135	440	219,1	6,3	160	5,3	100	447	800	36	26	0	79	4	1224	152	158
200	206	.0200.206.0	1610	159	440	219,1	6,3	160	5,3	100	447	1150	28	13	0	79	4	1224	152	158
250	45	.0250.045.0	720	140	530	273	7,1	160	7,4	105	683	255	110	332	0	140	4	1067	203	280
250	97	.0250.097.0	970	163	530	273	7,1	160	7,4	105	683	505	83	88	0	140	4	1067	203	280
250	151	.0250.151.0	1320	196	530	273	7,1	160	7,4	105	683	855	60	31	0	140	4	1067	203	280
250	206	.0250.206.0	1670	229	530	273	7,1	160	7,4	105	683	1205	48	16	0	140	4	1067	203	280



## Lateral expansion joints with weld ends

For movement in all planes Type LRR 63 ...

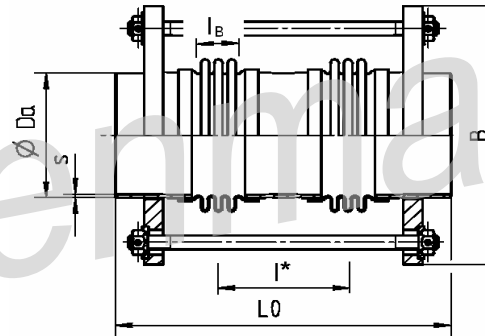


PN 63

Nominal diameter	Nominal lateral movement absorption	Type  LRR 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
50	50	.0050.050.0	540	11	210	60,3	4	110	0,6	60	47,8	260	3,6	28	0	2,3	2	1306	17	4,6
50	96	.0050.096.0	790	14	210	60,3	4	110	0,6	60	47,8	510	2,5	7,3	0	2,3	2	1306	17	4,6
50	155	.0050.155.0	1140	17	210	60,3	4	110	0,6	60	47,8	860	1,7	2,6	0	2,3	2	1306	17	4,6
50	198	.0050.198.0	1390	20	210	60,3	4	110	0,6	60	47,8	1110	1,4	1,5	0	2,3	2	1306	17	4,6
65	55	.0065.055.0	570	17	255	76,1	4	120	0,8	65	71,6	265	6,9	35	0	4	2	1127	22	8
65	96	.0065.096.0	820	21	255	76,1	4	120	0,8	65	71,6	515	4,8	9,3	0	4	2	1127	22	8
65	145	.0065.145.0	1120	25	255	76,1	4	120	0,8	65	71,6	815	3,5	3,7	0	4	2	1127	22	8
65	203	.0065.203.0	1470	30	255	76,1	4	120	0,8	65	71,6	1165	2,6	1,8	0	4	2	1127	22	8
80	50	.0080.050.0	590	26	305	88,9	4	130	1,1	65	91,6	265	12	44	0	6	2	1116	28	12
80	98	.0080.098.0	890	32	305	88,9	4	130	1,1	65	91,6	565	8,1	9,8	0	6	2	1116	28	12
80	152	.0080.152.0	1240	39	305	88,9	4	130	1,1	65	91,6	915	5,8	3,8	0	6	2	1116	28	12
80	191	.0080.191.0	1490	44	305	88,9	4	130	1,1	65	91,6	1165	4,8	2,3	0	6	2	1116	28	12

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 63 ...

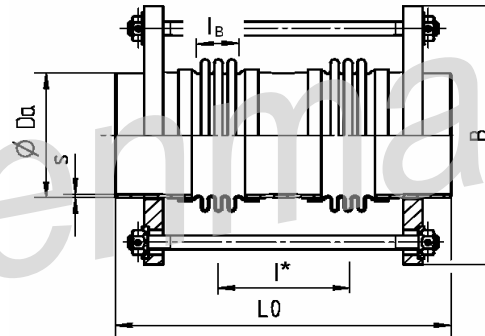


PN 63

Nominal diameter	Nominal lateral movement absorption	Type  LRR 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	I*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
100	50	.0100.050.0	700	44	350	114,3	5	160	2,1	90	138	290	20	68	0	12	2	1394	53	24
100	98	.0100.098.0	1000	53	350	114,3	5	160	2,1	90	138	590	14	17	0	12	2	1394	53	24
100	155	.0100.155.0	1400	66	350	114,3	5	160	2,1	90	138	990	10	6	0	12	2	1394	53	24
100	197	.0100.197.0	1700	75	350	114,3	5	160	2,1	90	138	1290	8,2	3,6	0	12	2	1394	53	24
125	55	.0125.055.0	740	62	415	139,7	6,3	160	3,3	68	189	318	30	73	0	22	2	1292	68	44
125	99	.0125.099.0	1040	75	415	139,7	6,3	160	3,3	68	189	618	21	20	0	22	2	1292	68	44
125	143	.0125.143.0	1340	89	415	139,7	6,3	160	3,3	68	189	918	17	8,9	0	22	2	1292	68	44
125	201	.0125.201.0	1740	106	415	139,7	6,3	160	3,3	68	189	1318	13	4,3	0	22	2	1292	68	44
150	50	.0150.050.0	750	85	390	168,3	6,3	160	4	95	272	295	38	132	0	40	4	1412	107	80
150	98	.0150.098.0	1050	103	390	168,3	6,3	160	4	95	272	595	27	33	0	40	4	1412	107	80
150	153	.0150.153.0	1450	127	390	168,3	6,3	160	4	95	272	995	19	12	0	40	4	1412	107	80
150	195	.0150.195.0	1750	145	390	168,3	6,3	160	4	95	272	1295	16	7,1	0	40	4	1412	107	80

## Lateral expansion joints with weld ends

For movement in all planes Type LRR 63 ...



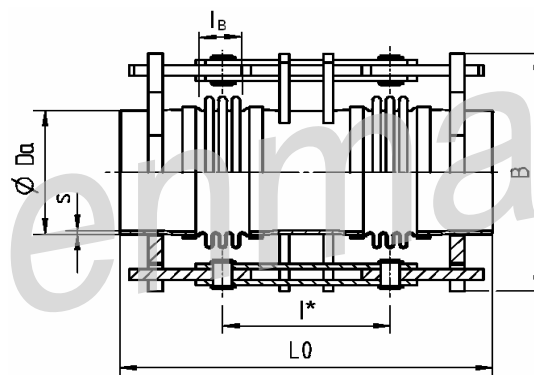
### PN 63

Nominal diameter	Nominal lateral movement absorption	Type  LRR 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Number of tie rods	Spring rates at 20°C per one bellows		
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity		axial	angular	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	I*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	-	c <sub>δ</sub>	c <sub>α</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	-	N/mm	Nm/deg	kNm / deg
200	53	.0200.053.0	910	150	475	219,1	8	180	7,4	105	445	405	59	206	0	84	4	2501	309	168
200	95	.0200.095.0	1210	177	475	219,1	8	180	7,4	105	445	705	44	69	0	84	4	2501	309	168
200	142	.0200.142.0	1610	213	475	219,1	8	180	7,4	105	445	1105	33	28	0	84	4	2501	309	168
200	199	.0200.199.0	2110	257	475	219,1	8	180	7,4	105	445	1605	25	13	0	84	4	2501	309	168

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 06 ...



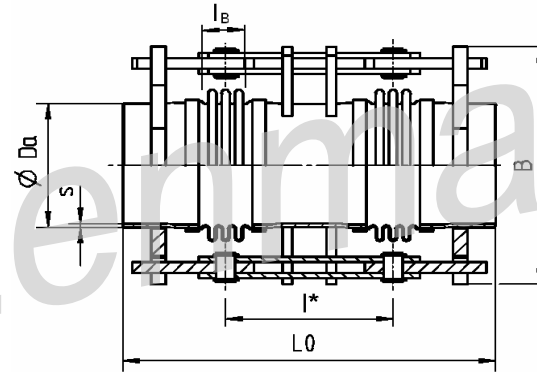
PN 6

Nominal diameter	Nominal lateral movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
		LRN 06 ...				outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	$2 \cdot \lambda_N$	-	L0	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
600	58	.0600.058.0	795	204	905	610	6	160	14,2	84	3217	334	462	493	8,1	896	77	493	7,9	1792
600	108	.0600.108.0	905	220	905	610	6	160	14,2	140	3217	390	396	214	9,9	538	77	296	13	1075
600	150	.0600.150.0	1055	241	905	610	6	160	14,2	140	3217	540	286	114	5,1	538	77	296	13	1075
600	205	.0600.205.0	1255	270	905	610	6	160	14,2	140	3217	740	209	61	2,7	538	77	296	13	1075
600	302	.0600.302.0	1605	319	905	610	6	160	14,2	140	3217	1090	142	28	1,3	538	77	296	13	1075
700	53	.0700.053.0	835	282	1015	711	8	180	24,8	84	4324	334	621	702	11	1394	104	703	11	2788
700	98	.0700.098.0	945	300	1015	711	8	180	24,8	140	4324	390	533	304	13	837	104	422	18	1673
700	152	.0700.152.0	1100	329	1015	711	8	180	24,8	168	4324	518	401	145	9	697	104	352	21	1394
700	211	.0700.211.0	1300	368	1015	711	8	180	24,8	168	4324	718	289	77	4,7	697	104	352	21	1394
700	299	.0700.299.0	1600	426	1015	711	8	180	24,8	168	4324	1018	204	39	2,3	697	104	352	21	1394

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 06 ...



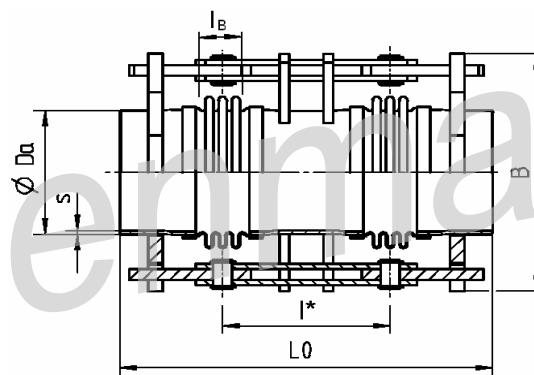
PN 6

Nominal diameter	Nominal lateral movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
		LRN 06 ...				outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	$2 \cdot \lambda_N$	-	L0	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
800	51	.0800.051.0	915	342	1125	813	8	200	31,6	99	5621	349	770	1209	15	2900	135	1337	16	5800
800	98	.0800.098.0	1045	373	1125	813	8	200	31,6	165	5621	415	649	503	18	1740	135	803	27	3480
800	151	.0800.151.0	1210	411	1125	813	8	200	31,6	198	5621	548	492	243	12	1450	135	668	32	2900
800	206	.0800.206.0	1410	453	1125	813	8	200	31,6	198	5621	748	361	133	6,6	1450	135	668	32	2900
800	303	.0800.303.0	1760	529	1125	813	8	200	31,6	198	5621	1098	246	63	3,1	1450	135	668	32	2900
900	52	.0900.052.0	1015	537	1285	914	8	225	40	99	7163	399	1073	1322	15	4245	215	1896	21	8489
900	97	.0900.097.0	1145	575	1285	914	8	225	40,0	165	7163	465	923	575	18	2547	215	1138	34	5093
900	150	.0900.150.0	1395	643	1285	914	8	225	40,0	165	7163	715	601	249	7,7	2547	215	1138	34	5093
900	197	.0900.197.0	1510	677	1285	914	8	225	40,0	198	7163	798	539	166	7,4	2123	215	949	41	4245
900	295	.0900.295.0	1910	784	1285	914	8	225	40,0	198	7163	1198	359	75	3,3	2123	215	949	41	4245

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 06 ...



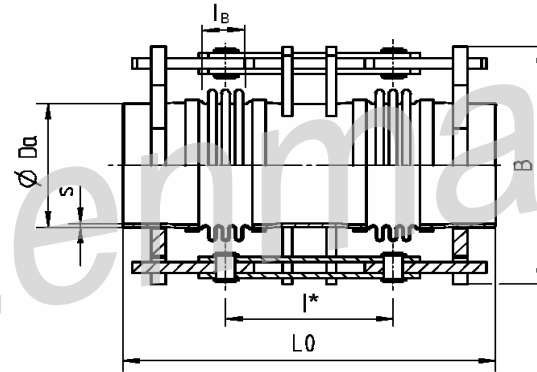
PN 6

Nominal diameter	Nominal lateral movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
		LRN 06 ...				outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	$2 \cdot \lambda_N$	-	L <sub>0</sub>	G	B	Da	s	L	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
1000	50	.1000.050.0	1035	593	1395	1016	8	225	44,5	105	8791	405	1298	1607	19	5643	264	2379	27	11286
1000	104	.1000.104.0	1220	650	1395	1016	8	225	44,5	175	8791	525	1007	572	19	3386	264	1426	45	6772
1000	152	.1000.152.0	1390	702	1395	1016	8	225	44,5	210	8791	660	800	302	14	2822	264	1189	54	5643
1000	210	.1000.210.0	1640	776	1395	1016	8	225	44,5	210	8791	910	580	161	7,4	2822	264	1189	54	5643
1000	303	.1000.303.0	2040	893	1395	1016	8	225	44,5	210	8791	1310	403	79	3,6	2822	264	1189	54	5643
1200	63	.1200.063.0	1155	817	1595	1220	10	250	74,1	140	12341	440	1677	1591	30	7095	370	2808	50	14189
1200	100	.1200.100.0	1320	882	1595	1220	10	250	74,1	175	12341	575	1290	755	22	5676	370	2245	63	11351
1200	155	.1200.155.0	1540	965	1595	1220	10	250	74,1	210	12341	760	976	362	15	4730	370	1872	75	9459
1200	206	.1200.206.0	1790	1065	1595	1220	10	250	74,1	210	12341	1010	734	207	8,5	4730	370	1872	75	9459
1200	308	.1200.308.0	2290	1263	1595	1220	10	250	74,1	210	12341	1510	491	93	3,8	4730	370	1872	75	9459

**Lateral expansion joints  
with weld ends**

**For movement in one plane**

**Type LRN 06 ...**



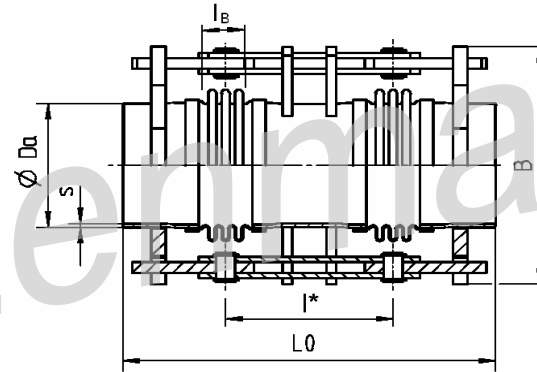
**PN 6**

Nominal diameter	Nominal lateral movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
		LRN 06 ...				outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	$2 \cdot \lambda_N$	-	L <sub>0</sub>	G	B	Da	s	L	G	l <sub>B</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
1400	50	.1400.050.0	1340	1153	1845	1420	10	250	86,4	120,6	16650	720,6	1850	1834	13	10566	666	8394	58	21131
1400	97	.1400.097.0	1480	1183	1845	1420	10	250	86,4	241,2	16650	741,2	1800	846	24	5283	666	4195	117	10565
1400	150	.1400.150.0	1880	1378	1845	1420	10	250	86,4	241,2	16650	1141,2	1168	364	10	5283	666	4195	117	10565
1400	202	.1400.202.0	2280	1578	1845	1420	10	250	86,4	241,2	16650	1541,2	865	201	5,6	5283	666	4195	117	10565
1400	307	.1400.307.0	3080	1973	1845	1420	10	250	86,4	241,2	16650	2341,2	569	87	2,4	5283	666	4195	117	10565
1600	47	.1600.047.0	1540	1706	2090	1620	10	300	118,4	120,6	21538	820,6	2627	2077	13	15713	1077	12301	76	31425
1600	103	.1600.103.0	1780	1799	2090	1620	10	300	118,4	241,2	21538	941,2	2291	779	20	7857	1077	6150	151	15713
1600	147	.1600.147.0	2180	2045	2090	1620	10	300	118,4	241,2	21538	1341,2	1607	388	9,6	7857	1077	6150	151	15713
1600	191	.1600.191.0	2580	2290	2090	1620	10	300	118,4	241,2	21538	1741,2	1238	231	5,7	7857	1077	6150	151	15713
1600	300	.1600.300.0	3580	2898	2090	1620	10	300	118,4	241,2	21538	2741,2	786	93	2,3	7857	1077	6150	151	15713

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 06 ...



PN 6

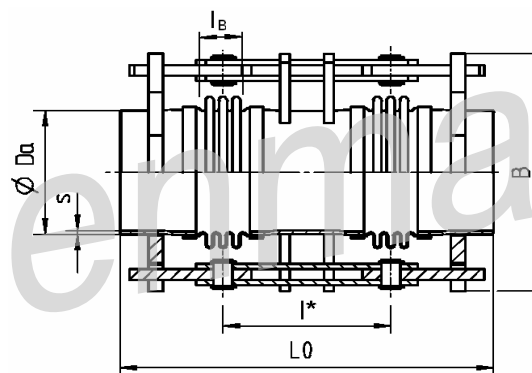
Nominal diameter	Nominal lateral movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
		LRN 06 ...				outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	$2 \cdot \lambda_N$	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
1800	63	.1800.063.0	1480	1770	2290	1820	10	300	133,1	241,2	27055	641,2	4227	2301	53	11154	1353	8628	190	22307
1800	102	.1800.102.0	1880	2036	2290	1820	10	300	133,1	241,2	27055	1041,2	2601	896	20	11154	1353	8628	190	22307
1800	151	.1800.151.0	2380	2365	2290	1820	10	300	133,1	241,2	27055	1541,2	1757	413	9,2	11154	1353	8628	190	22307
1800	199	.1800.199.0	2880	2699	2290	1820	10	300	133,1	241,2	27055	2041,2	1326	236	5,2	11154	1353	8628	190	22307
1800	307	.1800.307.0	3980	3425	2290	1820	10	300	133,1	241,2	27055	3141,2	862	100	2,2	11154	1353	8628	190	22307
2000	57	.2000.057.0	1580	2647	2600	2020	10	350	172,4	241,2	33200	641,2	6484	3119	65	15265	2075	11694	233	30529
2000	102	.2000.102.0	2080	3069	2600	2020	10	350	172,4	241,2	33200	1141,2	3640	1014	20	15265	2075	11694	233	30529
2000	146	.2000.146.0	2580	3492	2600	2020	10	350	172,4	241,2	33200	1641,2	2530	494	9,9	15265	2075	11694	233	30529
2000	200	.2000.200.0	3180	4000	2600	2020	10	350	172,4	241,2	33200	2241,2	1853	266	5,3	15265	2075	11694	233	30529
2000	306	.2000.306.0	4380	5011	2600	2020	10	350	172,4	241,2	33200	3441,2	1206	113	2,3	15265	2075	11694	233	30529



# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 10 ...



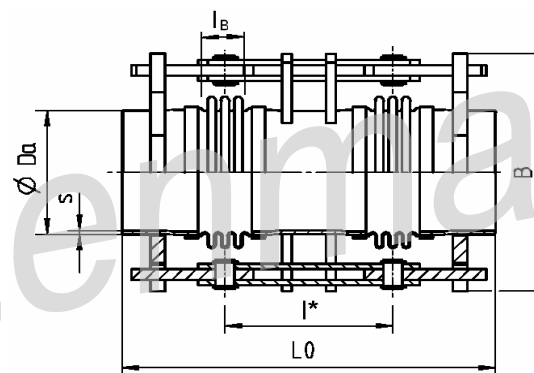
PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
600	55	.0600.055.0	840	262	905	610	8	180	21,2	87	3222	337	459	760	8,2	1351	77	775	8,2	2702
600	103	.0600.103.0	955	284	905	610	8	180	21,2	145	3222	395	392	325	10	811	77	465	14	1621
600	155	.0600.155.0	1155	319	905	610	8	180	21,2	145	3222	595	260	147	4,4	811	77	465	14	1621
600	207	.0600.207.0	1355	354	905	610	8	180	21,2	145	3222	795	195	83	2,5	811	77	465	14	1621
600	298	.0600.298.0	1705	414	905	610	8	180	21,2	145	3222	1145	135	40	1,2	811	77	465	14	1621
700	52	.0700.052.0	900	419	1065	711	8	200	27,6	96	4353	346	753	1273	12	2688	131	1381	12	5375
700	111	.0700.111.0	1075	469	1065	711	8	200	27,6	160	4353	460	568	429	11	1613	131	828	20	3225
700	152	.0700.152.0	1190	500	1065	711	8	200	27,6	192	4353	542	482	257	9,5	1344	131	690	24	2687
700	208	.0700.208.0	1390	546	1065	711	8	200	27,6	192	4353	742	352	140	5,1	1344	131	690	24	2687
700	307	.0700.307.0	1740	626	1065	711	8	200	27,6	192	4353	1092	239	65	2,3	1344	131	690	24	2687

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 10 ...



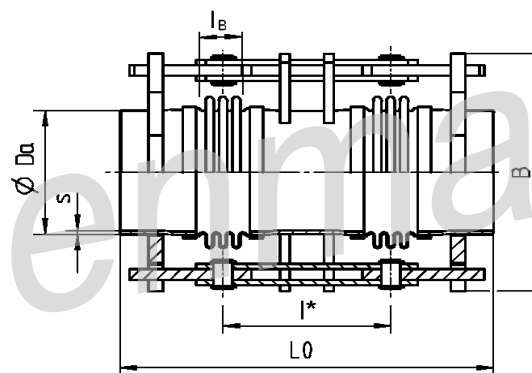
PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
800	51	.0800.051.0	970	507	1165	813	10	225	44,3	102	5635	352	958	1594	15	3844	169	1794	17	7687
800	98	.0800.098.0	1105	550	1165	813	10	225	44,3	170	5635	420	804	657	18	2306	169	1077	28	4612
800	150	.0800.150.0	1270	602	1165	813	10	225	44,3	204	5635	554	611	319	12	1922	169	897	33	3843
800	204	.0800.204.0	1470	660	1165	813	10	225	44,3	204	5635	754	449	176	6,7	1922	169	897	33	3843
800	299	.0800.299.0	1820	765	1165	813	10	225	44,3	204	5635	1104	307	83	3,1	1922	169	897	33	3843
900	52	.0900.052.0	1070	653	1295	914	10	250	55,4	102	7178	402	1069	1747	15	5626	215	2542	21	11251
900	97	.0900.097.0	1205	702	1295	914	10	250	55,4	170	7178	470	915	753	18	3376	215	1525	35	6751
900	146	.0900.146.0	1370	758	1295	914	10	250	55,4	204	7178	604	714	384	13	2813	215	1272	43	5625
900	194	.0900.194.0	1570	822	1295	914	10	250	55,4	204	7178	804	536	220	7,6	2813	215	1272	43	5625
900	291	.0900.291.0	1970	951	1295	914	10	250	55,4	204	7178	1204	358	99	3,4	2813	215	1272	43	5625

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 10 ...



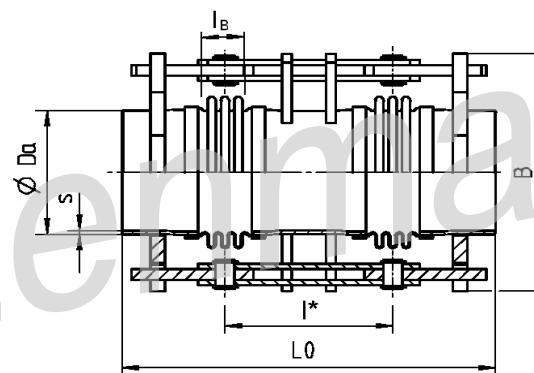
PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRN 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
1000	58	.1000.058.0	1260	973	1455	1016	10	300	74	144	8866	444	1598	2097	22	5521	355	3756	37	11042
1000	102	.1000.102.0	1480	1066	1455	1016	10	300	74	180	8866	630	1128	842	13	4417	355	3005	46	8834
1000	155	.1000.155.0	1705	1160	1455	1016	10	300	74	216	8866	816	869	418	9,6	3681	355	2502	56	7362
1000	212	.1000.212.0	2005	1275	1455	1016	10	300	74	216	8866	1116	635	226	5,1	3681	355	2502	56	7362
1000	298	.1000.298.0	2455	1450	1455	1016	10	300	74	216	8866	1566	453	116	2,6	3681	355	2502	56	7362
1200	51	.1200.051.0	1260	1280	1690	1220	10	300	89	144	12420	444	2797	3421	30	9350	621	6120	52	18699
1200	102	.1200.102.0	1505	1417	1690	1220	10	300	89	216	12420	616	2015	1176	24	6233	621	4081	78	12466
1200	151	.1200.151.0	1805	1569	1690	1220	10	300	89	216	12420	916	1355	544	11	6233	621	4081	78	12466
1200	201	.1200.201.0	2105	1721	1690	1220	10	300	89	216	12420	1216	1021	311	6	6233	621	4081	78	12466
1200	300	.1200.300.0	2705	2026	1690	1220	10	300	89	216	12420	1816	684	140	2,7	6233	621	4081	78	12466

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 10 ...



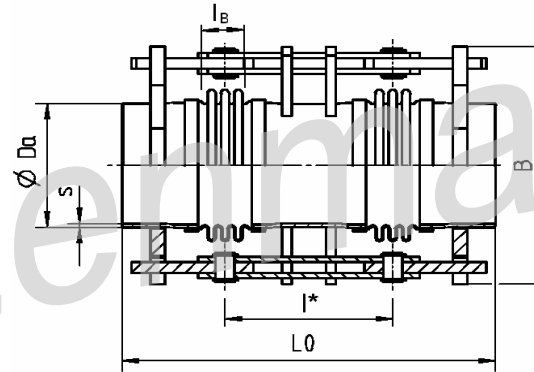
PN 10

Nominal diameter	Nominal lateral movement absorption	Type	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
		LRN 10 ...				outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
1400	54	.1400.054.0	1660	2204	1990	1420	10	350	120,9	129	16684	829	2513	2263	10	17294	1043	13760	63	34588
1400	106	.1400.106.0	1815	2274	1990	1420	10	350	120,9	258	16684	858	2432	1038	19	8647	1043	6882	125	17294
1400	155	.1400.155.0	2215	2549	1990	1420	10	350	120,9	258	16684	1258	1658	490	9,1	8647	1043	6882	125	17294
1400	204	.1400.204.0	2615	2824	1990	1420	10	350	120,9	258	16684	1658	1258	284	5,2	8647	1043	6882	125	17294
1400	303	.1400.303.0	3415	3379	1990	1420	10	350	120,9	258	16684	2458	849	130	2,4	8647	1043	6882	125	17294

**Lateral expansion joints  
with weld ends**

**For movement in one plane**

**Type LRN 16 ...**



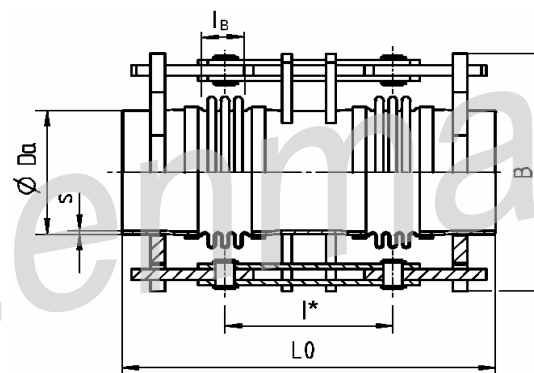
**PN 16**

Nominal diameter	Nominal lateral movement absorption	Type  LRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
500	53	.0500.053.0	810	247	795	508	8	180	17,6	84	2282	309	354	827	6,7	1085	55	715	5,6	2169
500	107	.0500.107.0	945	273	795	508	8	180	17,6	140	2282	390	281	308	7	651	55	429	9,3	1302
500	148	.0500.148.0	1095	296	795	508	8	180	17,6	140	2282	540	203	164	3,7	651	55	429	9,3	1302
500	203	.0500.203.0	1295	327	795	508	8	180	17,6	140	2282	740	148	88	1,9	651	55	429	9,3	1302
500	313	.0500.313.0	1695	387	795	508	8	180	17,6	140	2282	1140	96	37	0,8	651	55	429	9,3	1302
600	53	.0600.053.0	945	392	945	610	8	200	23,6	120	3232	370	525	1237	9,4	1416	97	1539	11	2832
600	99	.0600.099.0	1115	436	945	610	8	200	23,6	180	3232	480	404	484	8,4	944	97	1026	17	1888
600	150	.0600.150.0	1365	488	945	610	8	200	23,6	180	3232	730	266	214	3,6	944	97	1026	17	1888
600	202	.0600.202.0	1615	541	945	610	8	200	23,6	180	3232	980	198	120	2	944	97	1026	17	1888
600	305	.0600.305.0	2115	644	945	610	8	200	23,6	180	3232	1480	131	53	0,9	944	97	1026	17	1888

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 16 ...



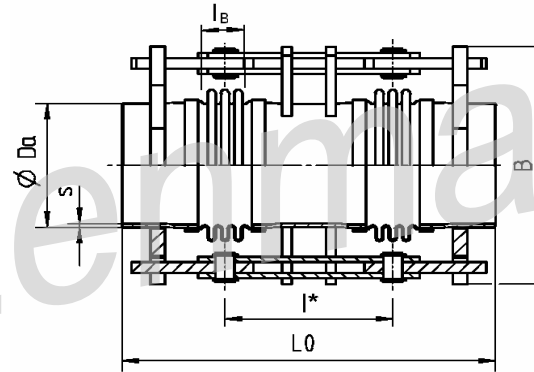
PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
700	54	.0700.054.0	1005	509	1065	711	10	225	38,6	124	4365	374	699	1480	13	2093	131	1893	16	4185
700	100	.0700.100.0	1180	562	1065	711	10	225	38,6	186	4365	486	538	577	11	1395	131	1262	24	2790
700	151	.0700.151.0	1430	629	1065	711	10	225	38,6	186	4365	736	355	259	5	1395	131	1262	24	2790
700	202	.0700.202.0	1680	695	1065	711	10	225	38,6	186	4365	986	265	146	2,8	1395	131	1262	24	2790
700	304	.0700.304.0	2180	827	1065	711	10	225	38,6	186	4365	1486	176	65	1,2	1395	131	1262	24	2790
800	58	.0800.058.0	1120	759	1225	813	10	250	49,2	128	5641	428	1054	1542	13	3044	226	2557	21	6088
800	105	.0800.105.0	1300	828	1225	813	10	250	49,2	192	5641	542	831	631	12	2030	226	1705	32	4059
800	153	.0800.153.0	1550	914	1225	813	10	250	49,2	192	5641	792	569	302	5,8	2030	226	1705	32	4059
800	211	.0800.211.0	1850	1013	1225	813	10	250	49,2	192	5641	1092	413	161	3	2030	226	1705	32	4059
800	307	.0800.307.0	2350	1184	1225	813	10	250	49,2	192	5641	1592	283	76	1,4	2030	226	1705	32	4059

**Lateral expansion joints  
with weld ends**

**For movement in one plane**

**Type LRN 16 ...**



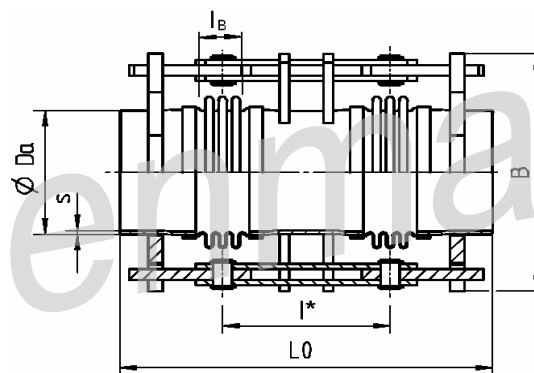
**PN 16**

Nominal diameter	Nominal lateral movement absorption	Type  LRN 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
900	52	.0900.052.0	1270	1145	1390	914	10	300	66,5	102	7238	502	1439	2088	9,8	6471	362	4707	21	12941
900	104	.0900.104.0	1455	1238	1390	914	10	300	66,5	170	7238	620	1167	814	11	3883	362	2825	36	7765
900	157	.0900.157.0	1670	1339	1390	914	10	300	66,5	204	7238	804	901	406	7,6	3236	362	2352	43	6471
900	205	.0900.205.0	1920	1448	1390	914	10	300	66,5	204	7238	1054	687	238	4,4	3236	362	2352	43	6471
900	293	.0900.293.0	2370	1641	1390	914	10	300	66,5	204	7238	1504	482	118	2,2	3236	362	2352	43	6471
1000	51	.1000.051.0	1310	1268	1500	1016	10	300	74	114	8891	514	1726	2808	13	9692	445	6654	29	19383
1000	102	.1000.102.0	1510	1386	1500	1016	10	300	74	190	8891	640	1389	1077	14	5815	445	3994	49	11630
1000	154	.1000.154.0	1735	1499	1500	1016	10	300	74	228	8891	828	1074	539	9,9	4846	445	3327	59	9692
1000	210	.1000.210.0	2035	1635	1500	1016	10	300	74	228	8891	1128	789	294	5,3	4846	445	3327	59	9692
1000	303	.1000.303.0	2535	1861	1500	1016	10	300	74	228	8891	1628	546	142	2,5	4846	445	3327	59	9692

## Lateral expansion joints with weld ends

For movement in one plane

Type LRN 25 ...



PN 25

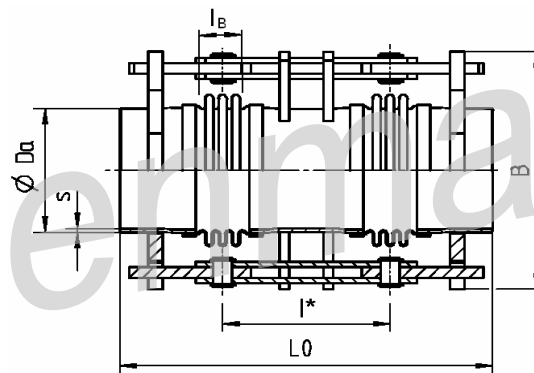
Nominal diameter	Nominal lateral movement absorption	Type  LRN 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
400	50	.0400.050.0	860	215	685	406,4	8	180	14,1	100	1473	350	201	707	4	493	35	791	4,3	986
400	100	.0400.100.0	1110	249	685	406,4	8	180	14,1	125	1473	575	123	212	1,9	395	35	633	5,4	789
400	153	.0400.153.0	1310	278	685	406,4	8	180	14,1	150	1473	750	94	104	1,3	329	35	528	6,4	657
400	203	.0400.203.0	1560	311	685	406,4	8	180	14,1	150	1473	1000	71	59	0,7	329	35	528	6,4	657
400	295	.0400.295.0	2010	369	685	406,4	8	180	14,1	150	1473	1450	49	28	0,4	329	35	528	6,4	657
450	51	.0450.051.0	905	329	785	457	8	200	17,6	104	1847	354	314	882	5,1	682	55	1002	5,6	1364
450	103	.0450.103.0	1110	372	785	457	8	200	17,6	156	1847	506	219	286	3,8	455	55	668	8,4	910
450	154	.0450.154.0	1360	416	785	457	8	200	17,6	156	1847	756	147	130	1,7	455	55	668	8,4	910
450	195	.0450.195.0	1560	450	785	457	8	200	17,6	156	1847	956	116	82	1,1	455	55	668	8,4	910
450	297	.0450.297.0	2060	543	785	457	8	200	17,6	156	1847	1456	76	36	0,5	455	55	668	8,4	910



## Lateral expansion joints with weld ends

For movement in one plane

Type LRN 25 ...



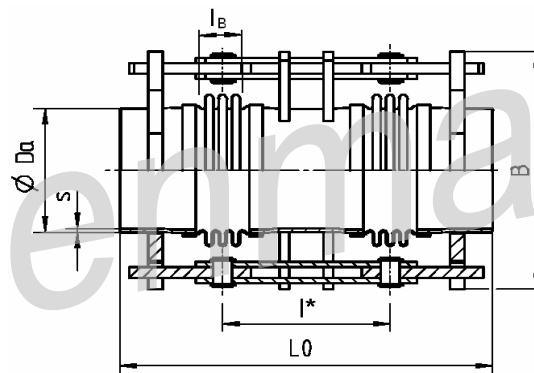
PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRN 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
500	53	.0500.053.0	965	384	845	508	8	200	19,6	120	2290	370	370	1153	6,7	1140	69	1457	8	2279
500	105	.0500.105.0	1220	438	845	508	8	200	19,6	150	2290	600	229	359	3,2	912	69	1166	10	1824
500	150	.0500.150.0	1380	475	845	508	8	200	19,6	180	2290	730	188	202	2,6	760	69	971	12	1520
500	202	.0500.202.0	1630	522	845	508	8	200	19,6	180	2290	980	140	113	1,4	760	69	971	12	1520
500	305	.0500.305.0	2130	615	845	508	8	200	19,6	180	2290	1480	93	50	0,6	760	69	971	12	1520
600	49	.0600.049.0	1065	621	1005	610	10	225	33,1	96	3257	446	584	1421	5,2	2423	130	2543	9,1	4845
600	98	.0600.098.0	1240	680	1005	610	10	225	33,1	160	3257	560	466	538	5,5	1454	130	1526	15	2907
600	151	.0600.151.0	1455	747	1005	610	10	225	33,1	192	3257	742	351	256	3,8	1212	130	1271	18	2423
600	202	.0600.202.0	1705	819	1005	610	10	225	33,1	192	3257	992	263	145	2,1	1212	130	1271	18	2423
600	303	.0600.303.0	2205	964	1005	610	10	225	33,1	192	3257	1492	175	64	0,9	1212	130	1271	18	2423

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 25 ...



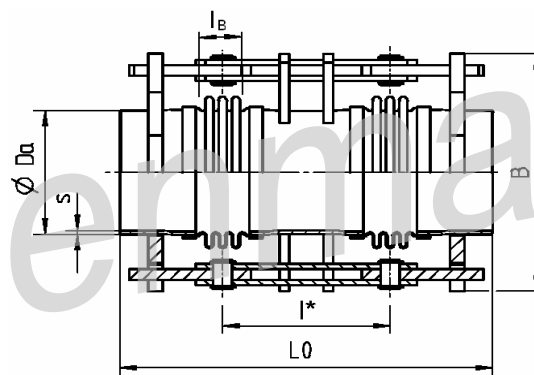
PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRN 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
700	51	.0700.051.0	1185	923	1160	711	10	300	51,5	132	4371	382	1146	2029	13	2810	219	2709	17	5620
700	103	.0700.103.0	1420	1022	1160	711	10	300	51,5	198	4371	548	796	651	9,6	1874	219	1805	25	3747
700	150	.0700.150.0	1670	1114	1160	711	10	300	51,5	198	4371	798	547	314	4,5	1874	219	1805	25	3747
700	207	.0700.207.0	1970	1227	1160	711	10	300	51,5	198	4371	1098	398	168	2,4	1874	219	1805	25	3747
700	301	.0700.301.0	2470	1418	1160	711	10	300	51,5	198	4371	1598	273	80	1,1	1874	219	1805	25	3747

# Lateral expansion joints with weld ends

For movement in one plane

Type LRN 40 ...



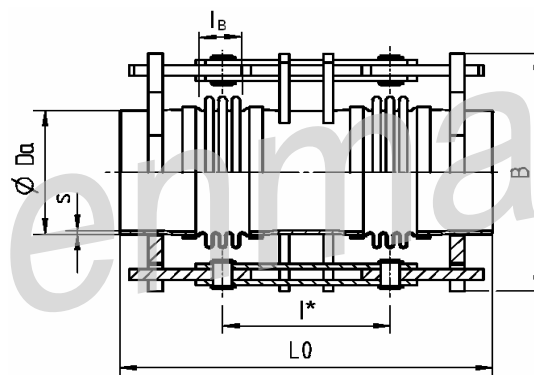
PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRN 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L0	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
300	52	.0300.052.0	855	193	585	323,9	8	160	9,9	92	946	392	115	447	1,9	284	23	625	2,5	568
300	101	.0300.101.0	1045	218	585	323,9	8	160	9,9	138	946	538	84	158	1,5	189	23	417	3,8	378
300	147	.0300.147.0	1295	246	585	323,9	8	160	9,9	138	946	788	58	75	0,7	189	23	417	3,8	378
300	194	.0300.194.0	1545	275	585	323,9	8	160	9,9	138	946	1038	44	43	0,4	189	23	417	3,8	378
300	297	.0300.297.0	2095	337	585	323,9	8	160	9,9	138	946	1588	29	19	0,2	189	23	417	3,8	378
350	51	.0350.051.0	915	277	675	355,6	8	200	13,6	96	1140	371	184	532	2,7	353	34	663	3,2	705
350	106	.0350.106.0	1135	315	675	355,6	8	200	13,6	144	1140	544	126	165	1,8	235	34	442	4,8	470
350	155	.0350.155.0	1385	354	675	355,6	8	200	13,6	144	1140	794	86	78	0,9	235	34	442	4,8	470
350	204	.0350.204.0	1635	393	675	355,6	8	200	13,6	144	1140	1044	66	46	0,5	235	34	442	4,8	470
350	301	.0350.301.0	2135	470	675	355,6	8	200	13,6	144	1140	1544	44	21	0,2	235	34	442	4,8	470

## Lateral expansion joints with weld ends

For movement in one plane

Type LRN 40 ...



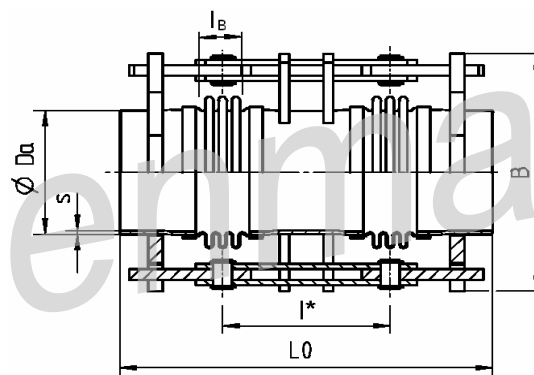
PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRN 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
400	50	.0400.050.0	915	321	725	406,4	10	200	19,4	108	1483	358	248	737	4,2	554	44	865	4,7	1108
400	99	.0400.099.0	1170	370	725	406,4	10	200	19,4	135	1483	585	152	223	1,9	443	44	692	5,8	886
400	149	.0400.149.0	1370	409	725	406,4	10	200	19,4	162	1483	762	117	111	1,4	370	44	577	7	739
400	198	.0400.198.0	1620	454	725	406,4	10	200	19,4	162	1483	1012	88	63	0,8	370	44	577	7	739
400	296	.0400.296.0	2120	551	725	406,4	10	200	19,4	162	1483	1512	59	28	0,4	370	44	577	7	739
450	49	.0450.049.0	945	383	785	457	10	200	21,9	116	1863	366	306	1052	5,4	876	56	1288	6,3	1751
450	107	.0450.107.0	1210	444	785	457	10	200	21,9	174	1863	574	195	286	3,3	584	56	858	9,4	1167
450	154	.0450.154.0	1460	493	785	457	10	200	21,9	174	1863	824	136	141	1,6	584	56	858	9,4	1167
450	201	.0450.201.0	1710	544	785	457	10	200	21,9	174	1863	1074	104	83	0,9	584	56	858	9,4	1167
450	304	.0450.304.0	2260	653	785	457	10	200	21,9	174	1863	1624	69	37	0,4	584	56	858	9,4	1167

## Lateral expansion joints with weld ends

For movement in one plane

Type LRN 40 ...



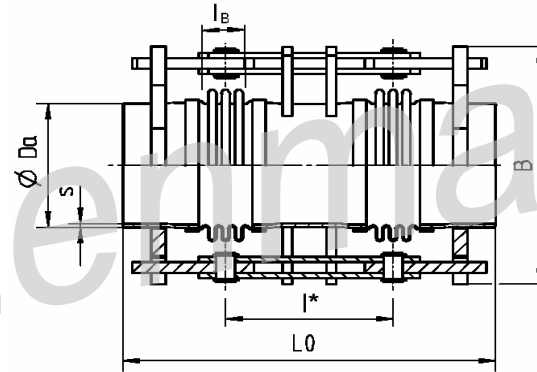
PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRN 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick- ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
500	47	.0500.047.0	1140	585	895	508	10	250	30,5	116	2286	466	392	1252	4,1	1022	91	2465	7,7	2044
500	96	.0500.096.0	1405	661	895	508	10	250	30,5	174	2286	674	271	400	2,9	682	91	1643	12	1363
500	146	.0500.146.0	1755	752	895	508	10	250	30,5	174	2286	1024	179	175	1,3	682	91	1643	12	1363
500	196	.0500.196.0	2105	843	895	508	10	250	30,5	174	2286	1374	133	98	0,7	682	91	1643	12	1363
500	296	.0500.296.0	2805	1025	895	508	10	250	30,5	174	2286	2074	88	43	0,3	682	91	1643	12	1363

## Lateral expansion joints with weld ends

For movement in one plane

Type LRN 63 ...



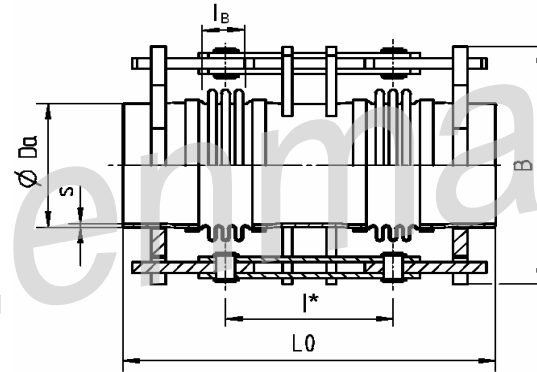
PN 63

Nominal diameter	Nominal lateral movement absorption	Type  LRN 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
250	51	.0250.051.0	920	206	555	273	10	200	12,9	115	686	365	90	385	2	171	16	473	2,3	341
250	104	.0250.104.0	1215	241	555	273	10	200	12,9	138	686	638	52	107	0,8	142	16	394	2,8	284
250	153	.0250.153.0	1515	276	555	273	10	200	12,9	138	686	938	35	50	0,4	142	16	394	2,8	284
250	202	.0250.202.0	1815	311	555	273	10	200	12,9	138	686	1238	27	29	0,2	142	16	394	2,8	284
300	48	.0300.048.0	950	303	625	323,9	11	200	16,9	100	951	400	142	490	2	322	29	716	2,8	644
300	100	.0300.100.0	1200	349	625	323,9	11	200	16,9	150	951	600	95	146	1,3	215	29	478	4,2	429
300	150	.0300.150.0	1500	400	625	323,9	11	200	16,9	150	951	900	63	65	0,6	215	29	478	4,2	429
300	200	.0300.200.0	1800	452	625	323,9	11	200	16,9	150	951	1200	48	37	0,3	215	29	478	4,2	429
300	299	.0300.299.0	2400	555	625	323,9	11	200	16,9	150	951	1800	32	17	0,1	215	29	478	4,2	429

## Lateral expansion joints with weld ends

For movement in one plane

Type LRN 63 ...



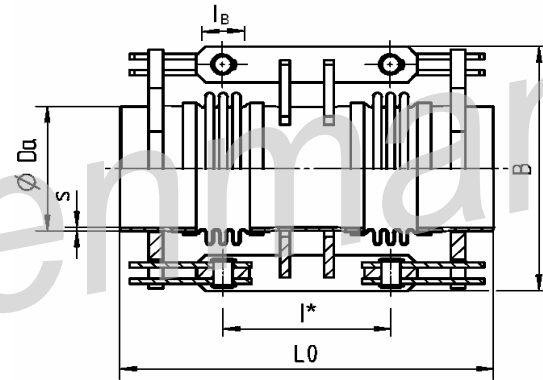
PN 63

Nominal diameter	Nominal lateral movement absorption	Type  LRN 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L <sub>0</sub>	G	B	D <sub>a</sub>	s	L	G	l <sub>b</sub>	A <sub>e</sub>	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
350	49	.0350.049.0	1045	366	675	355,6	12	225	22,7	116	1161	416	168	686	2,6	553	35	1086	3,9	1106
350	97	.0350.097.0	1260	414	675	355,6	12	225	22,7	174	1161	574	122	239	2	369	35	724	5,9	737
350	147	.0350.147.0	1560	472	675	355,6	12	225	22,7	174	1161	874	80	105	0,9	369	35	724	5,9	737
350	198	.0350.198.0	1860	529	675	355,6	12	225	22,7	174	1161	1174	59	58	0,5	369	35	724	5,9	737
350	299	.0350.299.0	2460	643	675	355,6	12	225	22,7	174	1161	1774	39	26	0,2	369	35	724	5,9	737
400	52	.0400.052.0	1120	546	785	406,4	15	225	32,4	135	1479	485	244	664	2,8	460	59	1427	5,8	919
400	102	.0400.102.0	1470	642	785	406,4	15	225	32,4	162	1479	812	146	201	1,2	383	59	1189	7	766
400	152	.0400.152.0	1870	753	785	406,4	15	225	32,4	162	1479	1212	98	91	0,5	383	59	1189	7	766
400	196	.0400.196.0	2220	852	785	406,4	15	225	32,4	162	1479	1562	76	55	0,3	383	59	1189	7	766
400	297	.0400.297.0	3020	1078	785	406,4	15	225	32,4	162	1479	2362	50	24	0,1	383	59	1189	7	766

**Lateral expansion joints  
with weld ends**

**For movement in all planes**

**Type LRK 06 ...**



**PN 6**

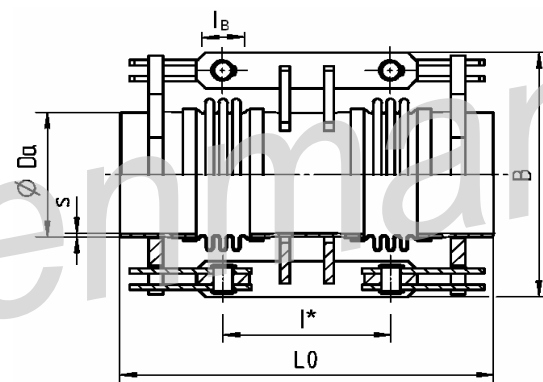
Nominal diameter	Nominal lateral movement absorption	Type  LRK 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
600	58	.0600.058.0	795	232	905	610	6	160	14,2	84	3217	334	462	493	8,1	896	77	493	7,9	1792
600	108	.0600.108.0	905	249	905	610	6	160	14,2	140	3217	390	396	214	9,9	538	77	296	13	1075
600	150	.0600.150.0	1055	270	905	610	6	160	14,2	140	3217	540	286	114	5,1	538	77	296	13	1075
600	205	.0600.205.0	1255	299	905	610	6	160	14,2	140	3217	740	209	61	2,7	538	77	296	13	1075
600	302	.0600.302.0	1605	348	905	610	6	160	14,2	140	3217	1090	142	28	1,3	538	77	296	13	1075
700	53	.0700.053.0	835	310	1015	711	8	180	24,8	84	4324	334	621	702	11	1394	104	703	11	2788
700	98	.0700.098.0	945	328	1015	711	8	180	24,8	140	4324	390	533	304	13	837	104	422	18	1673
700	152	.0700.152.0	1100	358	1015	711	8	180	24,8	168	4324	518	401	145	9	697	104	352	21	1394
700	211	.0700.211.0	1300	397	1015	711	8	180	24,8	168	4324	718	289	77	4,7	697	104	352	21	1394
700	299	.0700.299.0	1600	455	1015	711	8	180	24,8	168	4324	1018	204	39	2,3	697	104	352	21	1394



# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 06 ...



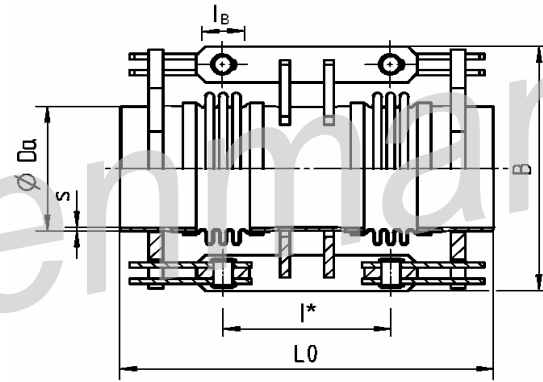
PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRK 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
800	51	.0800.051.0	915	371	1125	813	8	200	31,6	99	5621	349	770	1209	15	2900	135	1337	16	5800
800	98	.0800.098.0	1045	402	1125	813	8	200	31,6	165	5621	415	649	503	18	1740	135	803	27	3480
800	151	.0800.151.0	1210	438	1125	813	8	200	31,6	198	5621	548	492	243	12	1450	135	668	32	2900
800	206	.0800.206.0	1410	481	1125	813	8	200	31,6	198	5621	748	361	133	6,6	1450	135	668	32	2900
800	303	.0800.303.0	1760	556	1125	813	8	200	31,6	198	5621	1098	246	63	3,1	1450	135	668	32	2900
900	52	.0900.052.0	1015	587	1285	914	8	225	40	99	7163	399	1073	1322	15	4245	215	1896	21	8489
900	97	.0900.097.0	1145	627	1285	914	8	225	40,0	165	7163	465	923	575	18	2547	215	1138	34	5093
900	150	.0900.150.0	1395	695	1285	914	8	225	40,0	165	7163	715	601	249	7,7	2547	215	1138	34	5093
900	197	.0900.197.0	1510	728	1285	914	8	225	40,0	198	7163	798	539	166	7,4	2123	215	949	41	4245
900	295	.0900.295.0	1910	835	1285	914	8	225	40,0	198	7163	1198	359	75	3,3	2123	215	949	41	4245

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 06 ...



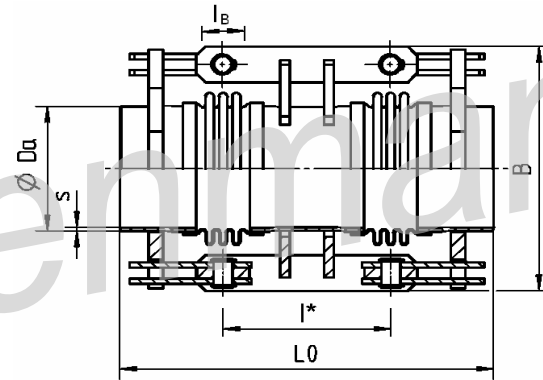
PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRK 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
1000	50	.1000.050.0	1035	644	1395	1016	8	225	44,5	105	8791	405	1298	1607	19	5643	264	2379	27	11286
1000	104	.1000.104.0	1220	702	1395	1016	8	225	44,5	175	8791	525	1007	572	19	3386	264	1426	45	6772
1000	152	.1000.152.0	1390	753	1395	1016	8	225	44,5	210	8791	660	800	302	14	2822	264	1189	54	5643
1000	210	.1000.210.0	1640	828	1395	1016	8	225	44,5	210	8791	910	580	161	7,4	2822	264	1189	54	5643
1000	303	.1000.303.0	2040	944	1395	1016	8	225	44,5	210	8791	1310	403	79	3,6	2822	264	1189	54	5643
1200	63	.1200.063.0	1155	868	1595	1220	10	250	74,1	140	12341	440	1677	1591	30	7095	370	2808	50	14189
1200	100	.1200.100.0	1320	933	1595	1220	10	250	74,1	175	12341	575	1290	755	22	5676	370	2245	63	11351
1200	155	.1200.155.0	1540	1016	1595	1220	10	250	74,1	210	12341	760	976	362	15	4730	370	1872	75	9459
1200	206	.1200.206.0	1790	1116	1595	1220	10	250	74,1	210	12341	1010	734	207	8,5	4730	370	1872	75	9459
1200	308	.1200.308.0	2290	1314	1595	1220	10	250	74,1	210	12341	1510	491	93	3,8	4730	370	1872	75	9459

**Lateral expansion joints  
with weld ends**

**For movement in all planes**

**Type LRK 06 ...**



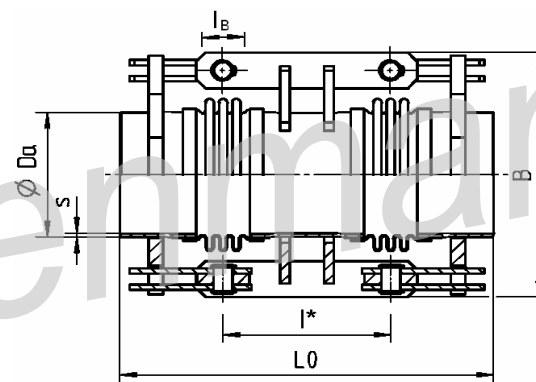
**PN 6**

Nominal diameter	Nominal lateral movement absorption	Type  LRK 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	lm/deg bar	kNm / deg
1400	50	.1400.050.0	1340	1272	1845	1420	10	250	86,4	120,6	16650	721	1850	1834	13	10566	666	8394	58	21131
1400	97	.1400.097.0	1480	1302	1845	1420	10	250	86,4	241,2	16650	741	1800	846	24	5283	666	4195	117	10565
1400	150	.1400.150.0	1880	1497	1845	1420	10	250	86,4	241,2	16650	1141	1168	364	10	5283	666	4195	117	10565
1400	202	.1400.202.0	2280	1697	1845	1420	10	250	86,4	241,2	16650	1541	865	201	5,6	5283	666	4195	117	10565
1400	307	.1400.307.0	3080	2092	1845	1420	10	250	86,4	241,2	16650	2341	569	87	2,4	5283	666	4195	117	10565
1600	47	.1600.047.0	1540	1904	2090	1620	10	300	118,4	120,6	21538	821	2627	2077	13	15713	1077	12301	76	31425
1600	103	.1600.103.0	1780	1997	2090	1620	10	300	118,4	241,2	21538	941	2291	779	20	7857	1077	6150	151	15713
1600	147	.1600.147.0	2180	2243	2090	1620	10	300	118,4	241,2	21538	1341	1607	388	9,6	7857	1077	6150	151	15713
1600	191	.1600.191.0	2580	2488	2090	1620	10	300	118,4	241,2	21538	1741	1238	231	5,7	7857	1077	6150	151	15713
1600	300	.1600.300.0	3580	3096	2090	1620	10	300	118,4	241,2	21538	2741	786	93	2,3	7857	1077	6150	151	15713

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 06 ...



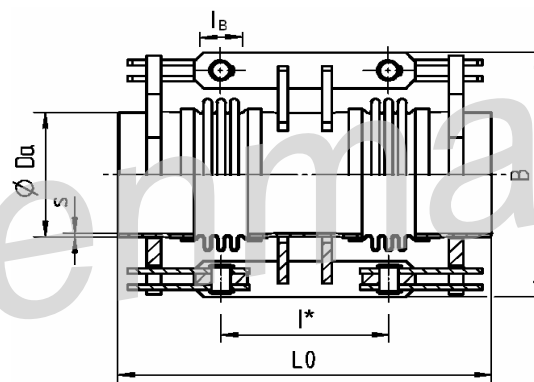
PN 6

Nominal diameter	Nominal lateral movement absorption	Type  LRK 06 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
1800	63	.1800.063.0	1480	1967	2290	1820	10	300	133,1	241,2	27055	641	4227	2301	53	11154	1353	8628	190	22307
1800	102	.1800.102.0	1880	2233	2290	1820	10	300	133,1	241,2	27055	1041	2601	896	20	11154	1353	8628	190	22307
1800	151	.1800.151.0	2380	2563	2290	1820	10	300	133,1	241,2	27055	1541	1757	413	9,2	11154	1353	8628	190	22307
1800	199	.1800.199.0	2880	2896	2290	1820	10	300	133,1	241,2	27055	2041	1326	236	5,2	11154	1353	8628	190	22307
1800	307	.1800.307.0	3980	3623	2290	1820	10	300	133,1	241,2	27055	3141	862	100	2,2	11154	1353	8628	190	22307

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 10 ...



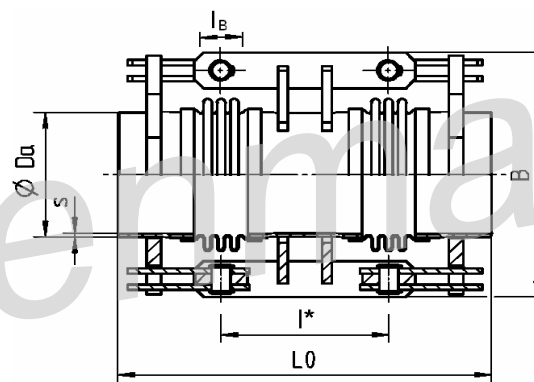
PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	lm/deg bar	kNm / deg
600	55	.0600.055.0	840	291	905	610	8	180	21,2	87	3222	337	459	760	8,2	1351	77	775	8,2	2702
600	103	.0600.103.0	955	313	905	610	8	180	21,2	145	3222	395	392	325	10	811	77	465	14	1621
600	155	.0600.155.0	1155	348	905	610	8	180	21,2	145	3222	595	260	147	4,4	811	77	465	14	1621
600	207	.0600.207.0	1355	382	905	610	8	180	21,2	145	3222	795	195	83	2,5	811	77	465	14	1621
600	298	.0600.298.0	1705	443	905	610	8	180	21,2	145	3222	1145	135	40	1,2	811	77	465	14	1621
700	52	.0700.052.0	900	470	1065	711	8	200	27,6	96	4353	346	753	1273	12	2688	131	1381	12	5375
700	111	.0700.111.0	1075	519	1065	711	8	200	27,6	160	4353	460	568	429	11	1613	131	828	20	3225
700	152	.0700.152.0	1190	551	1065	711	8	200	27,6	192	4353	542	482	257	9,5	1344	131	690	24	2687
700	208	.0700.208.0	1390	597	1065	711	8	200	27,6	192	4353	742	352	140	5,1	1344	131	690	24	2687
700	307	.0700.307.0	1740	677	1065	711	8	200	27,6	192	4353	1092	239	65	2,3	1344	131	690	24	2687

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 10 ...



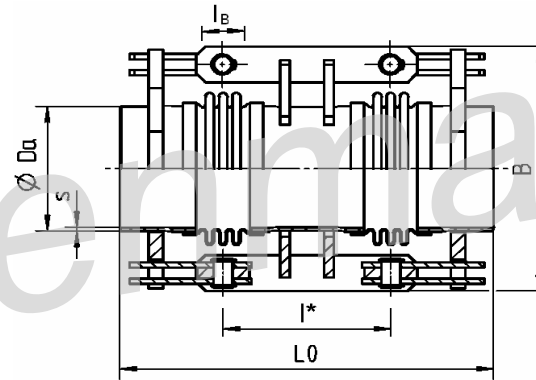
PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	lm/deg bar	kNm / deg
800	51	.0800.051.0	970	557	1165	813	10	225	44,3	102	5635	352	958	1594	15	3844	169	1794	17	7687
800	98	.0800.098.0	1105	601	1165	813	10	225	44,3	170	5635	420	804	657	18	2306	169	1077	28	4612
800	150	.0800.150.0	1270	653	1165	813	10	225	44,3	204	5635	554	611	319	12	1922	169	897	33	3843
800	204	.0800.204.0	1470	711	1165	813	10	225	44,3	204	5635	754	449	176	6,7	1922	169	897	33	3843
800	299	.0800.299.0	1820	815	1165	813	10	225	44,3	204	5635	1104	307	83	3,1	1922	169	897	33	3843
900	52	.0900.052.0	1070	704	1295	914	10	250	55,4	102	7178	402	1069	1747	15	5626	215	2542	21	11251
900	97	.0900.097.0	1205	753	1295	914	10	250	55,4	170	7178	470	915	753	18	3376	215	1525	35	6751
900	146	.0900.146.0	1370	810	1295	914	10	250	55,4	204	7178	604	714	384	13	2813	215	1272	43	5625
900	194	.0900.194.0	1570	873	1295	914	10	250	55,4	204	7178	804	536	220	7,6	2813	215	1272	43	5625
900	291	.0900.291.0	1970	1002	1295	914	10	250	55,4	204	7178	1204	358	99	3,4	2813	215	1272	43	5625

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 10 ...



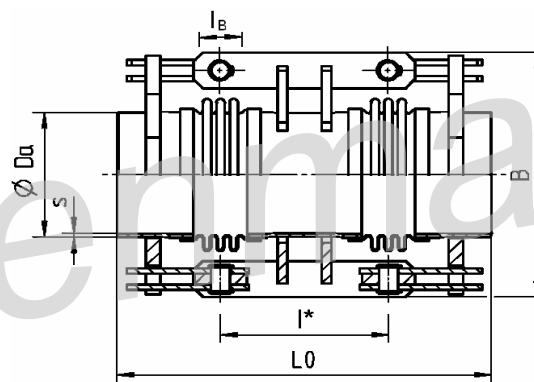
PN 10

Nominal diameter	Nominal lateral movement absorption	Type  LRK 10 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	lm/deg bar	kNm / deg
1000	58	.1000.058.0	1260	1091	1455	1016	10	300	74	144	8866	444	1598	2097	22	5521	355	3756	37	11042
1000	102	.1000.102.0	1480	1185	1455	1016	10	300	74	180	8866	630	1128	842	13	4417	355	3005	46	8834
1000	155	.1000.155.0	1705	1274	1455	1016	10	300	74	216	8866	816	869	418	9,6	3681	355	2502	56	7362
1000	212	.1000.212.0	2005	1390	1455	1016	10	300	74	216	8866	1116	635	226	5,1	3681	355	2502	56	7362
1000	298	.1000.298.0	2455	1565	1455	1016	10	300	74	216	8866	1566	453	116	2,6	3681	355	2502	56	7362
1200	51	.1200.051.0	1260	1482	1690	1220	10	300	89	144	12420	444	2797	3421	30	9350	621	6120	52	18699
1200	102	.1200.102.0	1505	1617	1690	1220	10	300	89	216	12420	616	2015	1176	24	6233	621	4081	78	12466
1200	151	.1200.151.0	1805	1769	1690	1220	10	300	89	216	12420	916	1355	544	11	6233	621	4081	78	12466
1200	201	.1200.201.0	2105	1921	1690	1220	10	300	89	216	12420	1216	1021	311	6	6233	621	4081	78	12466
1200	300	.1200.300.0	2705	2225	1690	1220	10	300	89	216	12420	1816	684	140	2,7	6233	621	4081	78	12466

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 16 ...



PN 16

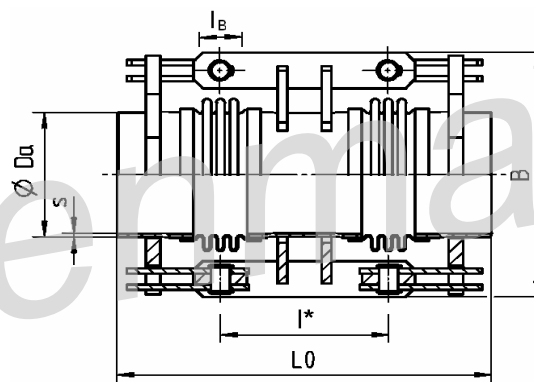
Nominal diameter	Nominal lateral movement absorption	Type  LRK 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
500	53	.0500.053.0	810	276	795	508	8	180	17,6	84	2282	309	354	827	6,7	1085	55	715	5,6	2169
500	107	.0500.107.0	945	302	795	508	8	180	17,6	140	2282	390	281	308	7	651	55	429	9,3	1302
500	148	.0500.148.0	1095	324	795	508	8	180	17,6	140	2282	540	203	164	3,7	651	55	429	9,3	1302
500	203	.0500.203.0	1295	355	795	508	8	180	17,6	140	2282	740	148	88	1,9	651	55	429	9,3	1302
500	313	.0500.313.0	1695	416	795	508	8	180	17,6	140	2282	1140	96	37	0,8	651	55	429	9,3	1302
600	53	.0600.053.0	945	442	945	610	8	200	23,6	120	3232	370	525	1237	9,4	1416	97	1539	11	2832
600	99	.0600.099.0	1115	485	945	610	8	200	23,6	180	3232	480	404	484	8,4	944	97	1026	17	1888
600	150	.0600.150.0	1365	538	945	610	8	200	23,6	180	3232	730	266	214	3,6	944	97	1026	17	1888
600	202	.0600.202.0	1615	590	945	610	8	200	23,6	180	3232	980	198	120	2	944	97	1026	17	1888
600	305	.0600.305.0	2115	694	945	610	8	200	23,6	180	3232	1480	131	53	0,9	944	97	1026	17	1888



# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 16 ...



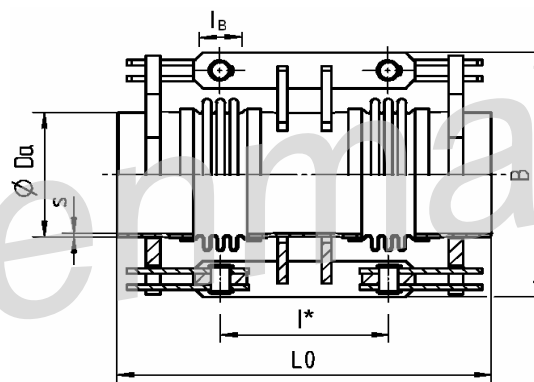
PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRK 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	lm/deg bar	kNm / deg
700	54	.0700.054.0	1005	560	1065	711	10	225	38,6	124	4365	374	699	1480	13	2093	131	1893	16	4185
700	100	.0700.100.0	1180	613	1065	711	10	225	38,6	186	4365	486	538	577	11	1395	131	1262	24	2790
700	151	.0700.151.0	1430	680	1065	711	10	225	38,6	186	4365	736	355	259	5	1395	131	1262	24	2790
700	202	.0700.202.0	1680	746	1065	711	10	225	38,6	186	4365	986	265	146	2,8	1395	131	1262	24	2790
700	304	.0700.304.0	2180	878	1065	711	10	225	38,6	186	4365	1486	176	65	1,2	1395	131	1262	24	2790
800	58	.0800.058.0	1120	878	1225	813	10	250	49,2	128	5641	428	1054	1542	13	3044	226	2557	21	6088
800	105	.0800.105.0	1300	947	1225	813	10	250	49,2	192	5641	542	831	631	12	2030	226	1705	32	4059
800	153	.0800.153.0	1550	1032	1225	813	10	250	49,2	192	5641	792	569	302	5,8	2030	226	1705	32	4059
800	211	.0800.211.0	1850	1132	1225	813	10	250	49,2	192	5641	1092	413	161	3	2030	226	1705	32	4059
800	307	.0800.307.0	2350	1302	1225	813	10	250	49,2	192	5641	1592	283	76	1,4	2030	226	1705	32	4059

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 16 ...



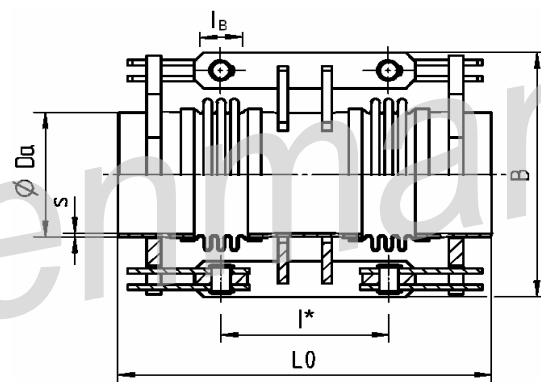
PN 16

Nominal diameter	Nominal lateral movement absorption	Type  LRK 16 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thickness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	lm/deg bar	kNm / deg
900	52	.0900.052.0	1270	1347	1390	914	10	300	66,5	102	7238	502	1439	2088	9,8	6471	362	4707	21	12941
900	104	.0900.104.0	1455	1439	1390	914	10	300	66,5	170	7238	620	1167	814	11	3883	362	2825	36	7765
900	157	.0900.157.0	1670	1540	1390	914	10	300	66,5	204	7238	804	901	406	7,6	3236	362	2352	43	6471
900	205	.0900.205.0	1920	1649	1390	914	10	300	66,5	204	7238	1054	687	238	4,4	3236	362	2352	43	6471
900	293	.0900.293.0	2370	1842	1390	914	10	300	66,5	204	7238	1504	482	118	2,2	3236	362	2352	43	6471
1000	51	.1000.051.0	1310	1471	1500	1016	10	300	74	114	8891	514	1726	2808	13	9692	445	6654	29	19383
1000	102	.1000.102.0	1510	1586	1500	1016	10	300	74	190	8891	640	1389	1077	14	5815	445	3994	49	11630
1000	154	.1000.154.0	1735	1700	1500	1016	10	300	74	228	8891	828	1074	539	9,9	4846	445	3327	59	9692
1000	210	.1000.210.0	2035	1836	1500	1016	10	300	74	228	8891	1128	789	294	5,3	4846	445	3327	59	9692
1000	303	.1000.303.0	2535	2062	1500	1016	10	300	74	228	8891	1628	546	142	2,5	4846	445	3327	59	9692

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 25 ...



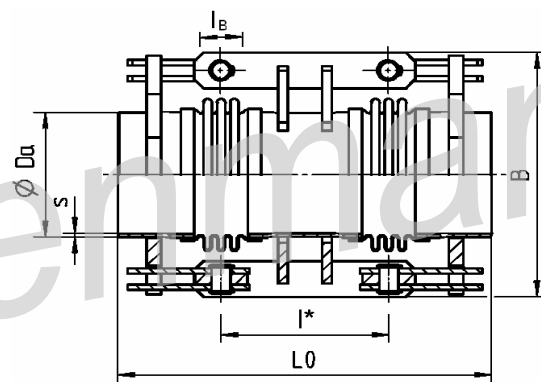
PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRK 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg bar	kNm / deg
400	50	.0400.050.0	860	243	685	406,4	8	180	14,1	100	1473	350	201	707	4	493	35	791	4,3	986
400	100	.0400.100.0	1110	278	685	406,4	8	180	14,1	125	1473	575	123	212	1,9	395	35	633	5,4	789
400	153	.0400.153.0	1310	306	685	406,4	8	180	14,1	150	1473	750	94	104	1,3	329	35	528	6,4	657
400	203	.0400.203.0	1560	339	685	406,4	8	180	14,1	150	1473	1000	71	59	0,7	329	35	528	6,4	657
400	295	.0400.295.0	2010	398	685	406,4	8	180	14,1	150	1473	1450	49	28	0,4	329	35	528	6,4	657
450	51	.0450.051.0	905	379	785	457	8	200	17,6	104	1847	354	314	882	5,1	682	55	1002	5,6	1364
450	103	.0450.103.0	1110	422	785	457	8	200	17,6	156	1847	506	219	286	3,8	455	55	668	8,4	910
450	154	.0450.154.0	1360	466	785	457	8	200	17,6	156	1847	756	147	130	1,7	455	55	668	8,4	910
450	195	.0450.195.0	1560	500	785	457	8	200	17,6	156	1847	956	116	82	1,1	455	55	668	8,4	910
450	297	.0450.297.0	2060	593	785	457	8	200	17,6	156	1847	1456	76	36	0,5	455	55	668	8,4	910

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 25 ...



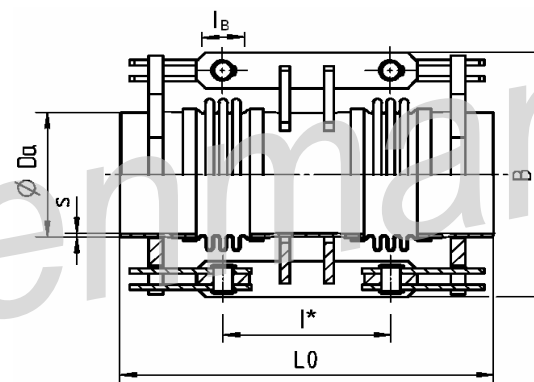
PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRK 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg ba	kNm / deg
500	53	.0500.053.0	965	434	845	508	8	200	19,6	120	2290	370	370	1153	6,7	1140	69	1457	8	2279
500	105	.0500.105.0	1220	488	845	508	8	200	19,6	150	2290	600	229	359	3,2	912	69	1166	10	1824
500	150	.0500.150.0	1380	526	845	508	8	200	19,6	180	2290	730	188	202	2,6	760	69	971	12	1520
500	202	.0500.202.0	1630	573	845	508	8	200	19,6	180	2290	980	140	113	1,4	760	69	971	12	1520
500	305	.0500.305.0	2130	666	845	508	8	200	19,6	180	2290	1480	93	50	0,6	760	69	971	12	1520
600	49	.0600.049.0	1065	740	1005	610	10	225	33,1	96	3257	446	584	1421	5,2	2423	130	2543	9,1	4845
600	98	.0600.098.0	1240	799	1005	610	10	225	33,1	160	3257	560	466	538	5,5	1454	130	1526	15	2907
600	151	.0600.151.0	1455	866	1005	610	10	225	33,1	192	3257	742	351	256	3,8	1212	130	1271	18	2423
600	202	.0600.202.0	1705	938	1005	610	10	225	33,1	192	3257	992	263	145	2,1	1212	130	1271	18	2423
600	303	.0600.303.0	2205	1083	1005	610	10	225	33,1	192	3257	1492	175	64	0,9	1212	130	1271	18	2423

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 25 ...



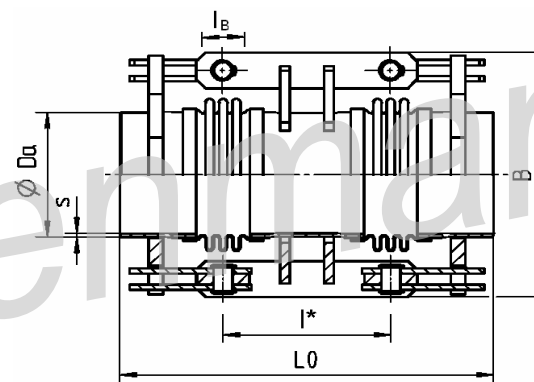
PN 25

Nominal diameter	Nominal lateral movement absorption	Type  LRK 25 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Nm/deg ba	kNm / deg
700	51	.0700.051.0	1185	1125	1160	711	10	300	51,5	132	4371	382	1146	2029	13	2810	219	2709	17	5620
700	103	.0700.103.0	1420	1223	1160	711	10	300	51,5	198	4371	548	796	651	9,6	1874	219	1805	25	3747
700	150	.0700.150.0	1670	1314	1160	711	10	300	51,5	198	4371	798	547	314	4,5	1874	219	1805	25	3747
700	207	.0700.207.0	1970	1427	1160	711	10	300	51,5	198	4371	1098	398	168	2,4	1874	219	1805	25	3747
700	301	.0700.301.0	2470	1618	1160	711	10	300	51,5	198	4371	1598	273	80	1,1	1874	219	1805	25	3747

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 40 ...



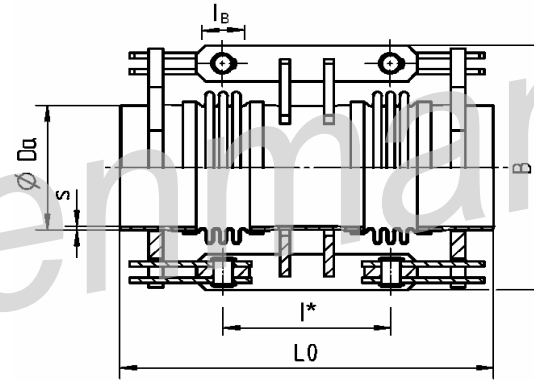
PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRK 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Jm/deg bar	kNm / deg
300	52	.0300.052.0	855	222	585	323,9	8	160	9,9	92	946	392	115	447	1,9	284	23	625	2,5	568
300	101	.0300.101.0	1045	246	585	323,9	8	160	9,9	138	946	538	84	158	1,5	189	23	417	3,8	378
300	147	.0300.147.0	1295	274	585	323,9	8	160	9,9	138	946	788	58	75	0,7	189	23	417	3,8	378
300	194	.0300.194.0	1545	303	585	323,9	8	160	9,9	138	946	1038	44	43	0,4	189	23	417	3,8	378
300	297	.0300.297.0	2095	365	585	323,9	8	160	9,9	138	946	1588	29	19	0,2	189	23	417	3,8	378
350	51	.0350.051.0	915	327	675	355,6	8	200	13,6	96	1140	371	184	532	2,7	353	34	663	3,2	705
350	106	.0350.106.0	1135	365	675	355,6	8	200	13,6	144	1140	544	126	165	1,8	235	34	442	4,8	470
350	155	.0350.155.0	1385	404	675	355,6	8	200	13,6	144	1140	794	86	78	0,9	235	34	442	4,8	470
350	204	.0350.204.0	1635	443	675	355,6	8	200	13,6	144	1140	1044	66	46	0,5	235	34	442	4,8	470
350	301	.0350.301.0	2135	520	675	355,6	8	200	13,6	144	1140	1544	44	21	0,2	235	34	442	4,8	470

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 40 ...



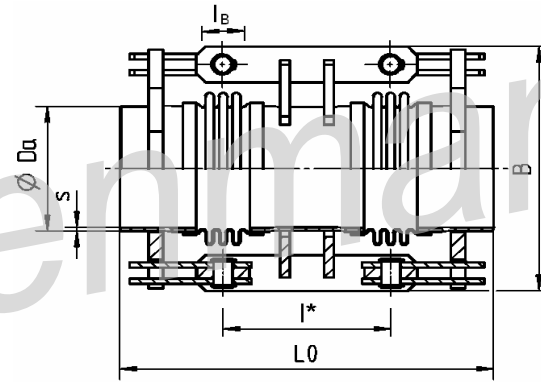
PN 40

Nominal diameter	Nominal lateral movement absorption	Type  LRK 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm²	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Jm/deg bar	kNm / deg
400	50	.0400.050.0	915	371	725	406,4	10	200	19,4	108	1483	358	248	737	4,2	554	44	865	4,7	1108
400	99	.0400.099.0	1170	421	725	406,4	10	200	19,4	135	1483	585	152	223	1,9	443	44	692	5,8	886
400	149	.0400.149.0	1370	460	725	406,4	10	200	19,4	162	1483	762	117	111	1,4	370	44	577	7	739
400	198	.0400.198.0	1620	505	725	406,4	10	200	19,4	162	1483	1012	88	63	0,8	370	44	577	7	739
400	296	.0400.296.0	2120	602	725	406,4	10	200	19,4	162	1483	1512	59	28	0,4	370	44	577	7	739
450	49	.0450.049.0	945	433	785	457	10	200	21,9	116	1863	366	306	1052	5,4	876	56	1288	6,3	1751
450	107	.0450.107.0	1210	494	785	457	10	200	21,9	174	1863	574	195	286	3,3	584	56	858	9,4	1167
450	154	.0450.154.0	1460	543	785	457	10	200	21,9	174	1863	824	136	141	1,6	584	56	858	9,4	1167
450	201	.0450.201.0	1710	594	785	457	10	200	21,9	174	1863	1074	104	83	0,9	584	56	858	9,4	1167
450	304	.0450.304.0	2260	703	785	457	10	200	21,9	174	1863	1624	69	37	0,4	584	56	858	9,4	1167

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 40 ...



PN 40

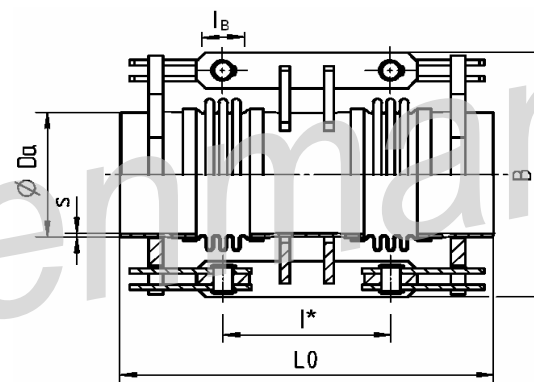
Nominal diameter	Nominal lateral movement absorption	Type  LRK 40 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	Jm/deg bar	kNm / deg
500	47	.0500.047.0	1140	705	895	508	10	250	30,5	116	2286	466	392	1252	4,1	1022	91	2465	7,7	2044
500	96	.0500.096.0	1405	781	895	508	10	250	30,5	174	2286	674	271	400	2,9	682	91	1643	12	1363
500	146	.0500.146.0	1755	872	895	508	10	250	30,5	174	2286	1024	179	175	1,3	682	91	1643	12	1363
500	196	.0500.196.0	2105	963	895	508	10	250	30,5	174	2286	1374	133	98	0,7	682	91	1643	12	1363
500	296	.0500.296.0	2805	1145	895	508	10	250	30,5	174	2286	2074	88	43	0,3	682	91	1643	12	1363



# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 63 ...



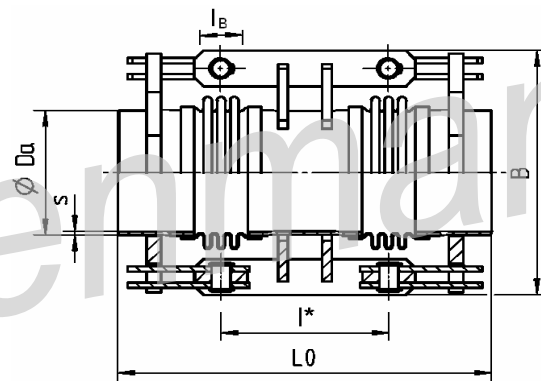
PN 63

Nominal diameter	Nominal lateral movement absorption	Type  LRK 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	L0	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	m/deg bar	kNm / deg
250	51	.0250.051.0	920	234	555	273	10	200	12,9	115	686	365	90	385	2	171	16	473	2,3	341
250	104	.0250.104.0	1215	269	555	273	10	200	12,9	138	686	638	52	107	0,8	142	16	394	2,8	284
250	153	.0250.153.0	1515	304	555	273	10	200	12,9	138	686	938	35	50	0,4	142	16	394	2,8	284
250	202	.0250.202.0	1815	339	555	273	10	200	12,9	138	686	1238	27	29	0,2	142	16	394	2,8	284
300	48	.0300.048.0	950	351	625	323,9	11	200	16,9	100	951	400	142	490	2	322	29	716	2,8	644
300	100	.0300.100.0	1200	397	625	323,9	11	200	16,9	150	951	600	95	146	1,3	215	29	478	4,2	429
300	150	.0300.150.0	1500	448	625	323,9	11	200	16,9	150	951	900	63	65	0,6	215	29	478	4,2	429
300	200	.0300.200.0	1800	500	625	323,9	11	200	16,9	150	951	1200	48	37	0,3	215	29	478	4,2	429
300	299	.0300.299.0	2400	603	625	323,9	11	200	16,9	150	951	1800	32	17	0,1	215	29	478	4,2	429

# Lateral expansion joints with weld ends

For movement in all planes

Type LRK 63 ...



PN 63

Nominal diameter	Nominal lateral movement absorption	Type  LRK 63 ...	Overall length	Weight approx.	Max. width approx.	Weld ends				Bellows		Middle distance of the bellows	Spring rates at 20°C per expansion joint				Spring rates at 20°C per one bellows			
						outside diameter	wall thick-ness	length	Weight	corrugated length	effective area		Friction factor	lateral	Pressure factor	Torsional rigidity	Friction factor	angular	Pressure factor	Torsional rigidity
DN	2-y	-	Lo	G	B	Da	s	L	G	lb	Ae	l*	c <sub>r</sub>	c <sub>λ</sub>	c <sub>p</sub>	c <sub>T</sub>	c <sub>r</sub>	c <sub>α</sub>	c <sub>p</sub>	c <sub>T</sub>
-	mm	-	mm	kg	mm	mm	mm	mm	kg	mm	cm <sup>2</sup>	mm	N/bar	N/mm	N/mm bar	kNm / deg	Nm/bar	Nm/deg	m/deg bar	kNm / deg
350	49	.0350.049.0	1045	416	675	355,6	12	225	22,7	116	1161	416	168	686	2,6	553	35	1086	3,9	1106
350	97	.0350.097.0	1260	465	675	355,6	12	225	22,7	174	1161	574	122	239	2	369	35	724	5,9	737
350	147	.0350.147.0	1560	523	675	355,6	12	225	22,7	174	1161	874	80	105	0,9	369	35	724	5,9	737
350	198	.0350.198.0	1860	580	675	355,6	12	225	22,7	174	1161	1174	59	58	0,5	369	35	724	5,9	737
350	299	.0350.299.0	2460	694	675	355,6	12	225	22,7	174	1161	1774	39	26	0,2	369	35	724	5,9	737
400	52	.0400.052.0	1120	660	785	406,4	15	225	32,4	135	1479	485	244	664	2,8	460	59	1427	5,8	919
400	102	.0400.102.0	1470	757	785	406,4	15	225	32,4	162	1479	812	146	201	1,2	383	59	1189	7	766
400	152	.0400.152.0	1870	868	785	406,4	15	225	32,4	162	1479	1212	98	91	0,5	383	59	1189	7	766
400	196	.0400.196.0	2220	967	785	406,4	15	225	32,4	162	1479	1562	76	55	0,3	383	59	1189	7	766
400	297	.0400.297.0	3020	1192	785	406,4	15	225	32,4	162	1479	2362	50	24	0,1	383	59	1189	7	766